DOCUMENT RESUME

ED 355 407 CE 063 264

TITLE	Elementary/Middle School Keyboarding Strategies Guide.
INSTITUTION	National Business Education Association, Reston, Va.
REPORT NO	ISBN-0-933964-36
PUB DATE	92
NOTE	59p.
AVAILABLE FROM	National Business Education Association, 1914 Association Drive, Reston, VA 22091-1596 ($8 members, $10 nonmembers, plus shipping and handling).
PUB TYPE	Guides - Classroom Use - Teaching Guides (For Teacher) (052)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Classroom Techniques; *Computer Uses in Education; Curriculum Development; *Educational Resources; Elementary Education; Intermediate Grades; *Keyboarding (Data Entry); Middle Schools; Teaching Methods; *Typewriting

ABSTRACT

Developed through a cooperative effort of many teachers and researchers, this guide is intended to supplement existing elementary and middle school materials on keyboarding. The guide contains sections that are designed for stand-alone use. Topics cover a wide range of strategies, including teaching special needs students. The U.S. Postal Service guidelines for addressing mail and spacing following punctuation are included. The document consists of a large unit containing eight sections and a unit of references. The sections cover the following: (1) why teach keyboarding; (2) when to teach keyboarding skills; (3) curriculum design and articulation; (4) coordinating the efforts of administrators and keyboarding teachers; (5) promoting keyboarding through special activities; (6) classroom management (use of equipment, selection of furniture, use of textbooks, use of software, and classroom configuration); (7) fundamentals of keyboarding (five techniques and three skill conditioners); and (8) tips for teaching keyboarding to regular and special needs students. The unit of references consists of three items: a position statement about keyboarding, a narrative style review of literature and resources, and a list of 19 references. (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED355407

ELEMENTARY/MIDDLE SCHOOL KEYBOARDING STRATEGIES GUIDE

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL IN **OTHER THAN PAPER COPY** HAS BEEN GRANTED BY

R M'Donald

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)"

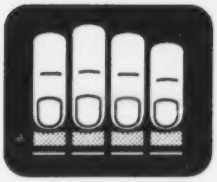
CE 063 267

National Business Education Association

BEST COPY AVAILABLE

Published by
National Business Education Association
1914 Association Drive
Reston, Virginia 22091-1596

Copyright 1992 by the National Business Education Association
ISBN 0-933964-36



Preface

This document is the product of many business educators. ***Elementary/Middle School Keyboarding Strategies Guide*** is the outgrowth of the National Business Education Association's charge to the Computer Education Task Force to develop guides/materials/strategies for computer-related curriculum. A Task Force subcommittee, the Task #3: Elementary/Middle School Keyboarding Strategies Guide Subcommittee, was assigned to develop an easy-to-use keyboarding guide for elementary/middle school educators which would supplement and not duplicate existing publications. ***Elementary/Middle School Keyboarding Strategies Guide*** is the fulfillment of the charge.

Elementary/Middle School Keyboarding Strategies Guide reflects the methods and materials used by teachers, administrators, and researchers who shared their expertise. The primary focus of ***Elementary/Middle School Keyboarding Strategies Guide*** is for use by elementary/middle school educators. While this is the case, the document has significant value to additional audiences—universities offering teacher preparation methodologies curriculum and those public and private institutions (secondary, postsecondary, adult education) offering introductory keyboarding instruction. Secondary and postsecondary business educators are encouraged to take leadership roles by actively supporting keyboarding instruction at elementary and middle schools.

Elementary/Middle School Keyboarding Strategies Guide contains sections that are designed for standalone use. Sections can be extracted and used independent of the entire document. Topics cover a wide range of strategies and include teaching special needs students, infusing computers into keyboarding courses, reinforcing keyboarding skills, articulating keyboarding instruction, and promoting keyboarding. The United States Postal Service guidelines for addressing mail and the spacing following punctuation are included to assist those who use this document to teach and reinforce these concepts. The line alignment in this document (ragged right rather than justified) has been selected in order to model the appropriate spacing following punctuation.

This guide is the result of efforts which began in 1984. Over the years, the committee amassed information about keyboarding at the elementary/middle school levels from research and publications. This then became the major resource from which the contents of the document were extracted. To enhance the easy-to-use feature of the document, the committee was instructed to avoid internal reference notations and to limit the number of references. This was accomplished by selecting current references which were specific to the document and placing them in a separate section at the end of the document.

In 1990, the table of contents for the document was developed and committee members extracted information that addressed their assigned topics. Committee members submitted their assignments as disk files, in most cases, to this editor. With assistance from Jefferson C. Boyce, the editor's late husband, disk files were converted as necessary, so the document could be produced with PageMaker on the Macintosh. Where disk files were not available, Jeff assisted additionally by scanning and converting printed copy to compatible disk files.

The editor is especially appreciative of the assistance provided by Kenneth W. Auvil, Professor Emeritus, Fine Arts Department, San Jose State University, San Jose, California. Ken designed the document cover, page layouts, and layout graphics. Additionally, he refined several existing illustrations and originated several others for the document—and he assisted with producing master pages for several sections. The remaining sections were produced by this editor.

Appreciation is extended to South-Western Publishing Co. and to the Business Education Unit, California Department of Education (CDE) for support that was provided for this document. South-Western Publishing Company granted permission to use illustrations from its Clip Art Folio. The Business Education Unit, CDE, granted permission to use illustrations and information from the Facilitator Handbook for Elementary Keyboarding, published in 1987 by the Business Education Center, California State Polytechnic University, Pomona, California, in cooperation with the Business Education Unit, CDE.

In efforts associated with any project of this magnitude, assistance is provided by many. Special appreciation is expressed to the following for their assistance with the preparation of this document: Mrs. Stephanie Bremner, Georgia State University, Atlanta; Mrs. Nellwyn Carlton, Andrea Self, and Julie Arnett from Stigler High School, Stigler, Oklahoma; and Metro County, Georgia, teachers Theresa Jarrell, Mayfred Nall, Anna Nebl, Vicki Nichols, Carmella Stires, Patricia Swann, Ruth Ann Winchester, and Patricia Wheeler.

The National Business Education Association in no way endorses or approves the use of specific hardware, software, methods, or materials described in this document. Although the subcommittee has attempted to be accurate in the keying and the preparation of the document, the National Business Education Association does not assume any responsibility for the accuracy of the material presented in the document.

Mrs. Betty L. Boyce
Production Editor and 1990-1991 Chair
Elementary/Middle School Keyboarding
Strategies Guide Subcommittee of the
NBEA Computer Education Task Force

Acknowledgments

Mrs. Betty L. Boyce
Business Education Center (Retired)
California State Polytechnic University, Pomona, California
Production Editor and Chairperson
Subcommittee on Elementary/Middle School Keyboarding Strategies Guide
NBEA Computer Education Task Force

Dr. Patsy C. Smith
Georgia State University, Atlanta, Georgia
Assistant Chairperson

Dr. Amanda Copeland
Kiamichi Area Vo-Tech Institute, Stigler, Oklahoma
Adviser

Subject-Matter Editors and Subcommittee Members:

Mrs. Mandy Allen
Georgia Department of Education
Atlanta, Georgia

Dr. Vivian Arnold
East Carolina University
Greenville, North Carolina

Dr. Marcia A. Anderson-Yates
Southern Illinois University
Carbondale, Illinois

Mrs. Betty L. Boyce (Retired)
BEC, Calif. State Polytechnic University
Pomona, California

Dr. Amanda Copeland
Kiamichi Area Vo-Tech
Stigler, Oklahoma

Dr. Annice M. Elliott
University of North Texas (Denton)
Fort Worth, Texas

Dr. Lawrence Erickson, Prof. Emeritus
University of California, Los Angeles
Los Angeles, California

Ms. Carolyn Geiger
San Antonio High School
Petaluma, California

Mrs. Patricia Headley (Retired)
Orono Indep. School District
Long Lake, Minnesota

Mrs. Virginia "Ginny" L. Held
Philomath High School
Philomath, Oregon

Mrs. Georgia Hering
Philomath Elementary School
Philomath, Oregon

Dr. Truman Jackson
Moorehead State University
Moorehead, Minnesota

Mrs. Claudia Jensen-Leppert
Oregon Dept. of Education
Salem, Oregon

Dr. Carol Larson Jones
Calif. State Potytechic Univ.
Pomona, California

C

Mrs. Jean Kinda
Bellflower High School
Bellflower, California

Mrs. Frieda Lofts
Toronto Board of Education
Toronto, Ontario

Ms. Betty Lowery
Garinger High School
Charlotte, North Carolina

Dr. Patricia Malone
Chemeketa Community College
Salem, Oregon

Mrs. Beverly McGahan
Southwestern Okla. St. Univ.
Weatherford, Oklahoma

Mr. Julian Milkes
Dowling College
Oakdale, New York

Dr. Scott Ober
Ball State University
Munice, Indiana

Dr. Lila Prigge
University of North Dakota
Grand Forks, North Dakota

Mrs. Georgina Seals
Chemeketa Community College
Salem, Oregon

Dr. June Schmidt
Virginia Polytechnic Institute
Blacksburg, Virginia

Ms. Karen Schmohe
Editor
Cincinnati, Ohio

Dr. Carolee Sormunen
Ball State University
Muncie, Indiana

Dr. Patsy C. Smith
Georgia State University
Atlanta, Georgia

Ms. Judy Timms
Metro Schools, Carolina Computer Access Cntr.
Charlotte, North Carolina

Dr. Judith E. Toppe
Huntington College
Huntington, Indiana

Ms. Gail Wickersham
Ball State University
Muncie, Indiana

Dr. Barbara Williams
University of Wisconsin
Superior, Wisconsin

Table of Contents

UNIT 1 KEY NOTES FOR KEYBOARDING

Section 1: Why Teach Keyboarding 1

Section 2: When To Teach 3

Section 3: Curriculum Design 4
3.1 The Introductory Course 5
3.2 Reinforcing Keyboarding Skills 7
3.3 Articulation 9

Section 4: Coordinating the Effort 10
4.1 Local Support for Keyboarding 11
4.2 Role of the Keyboarding Teacher 13

Section 5: Promoting Keyboarding 15

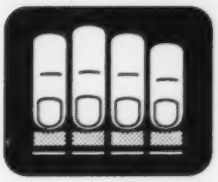
Section 6: Classroom Management 17
6.1 Use of Equipment 18
6.2 Selection of Desks/Chairs 19
6.3 Use of Textbooks 20
6.4 Use of Software 21
6.5 Classroom Configuration 23

Section 7: Fundamentals 25
Introduction 25
7.1 Technique #1: Proper Hand and Finger Position 26
7.2 Technique #2: Proper Keystroking 27
7.3 Technique #3: Proper Spacebar Control 28
7.4 Technique #4: Control of the Return Key 29
7.5 Technique #5: Proper Control of Shift Keys 30
7.6 Skill Conditioner #1: Build Council Keyboarding and Develop Proper Rhythm Patterns 31
7.7 Skill Conditioner #2: Develop Proper Reading of Copy for Keyboarding 32
7.8 Skill Conditioner #3: Develop the Proper Mind Set 33

Section 8: Tips 34
Introduction 34
8.1 General Tips 35
8.2 Teaching Special Needs Students 37

UNIT 2 REFERENCES

Section 1: This We Believe About Keyboarding - Policies Commission for Business and Economic Education 39
Section 2: A Research Summary 41
Section 3: Miscellaneous 47



KEY NOTES FOR KEYBOARDING

Section 1: Why Teach Keyboarding?

When students use computer programs that require a single-key response, such as "Y" for "Yes" or "N" for "No," they need little help in locating those keys. However, a myriad of research supports the need for keyboarding instruction—at any age—prior to the general use of computers and typewriters (see Unit 2: References). That is, students need formal instruction to acquire keyboarding skills using the touch system before they use computers or typewriters for more than those simple single-key responses. Keyboarding is a cumulative skill. As is true of most psychomotor skills, students who are allowed to develop keyboarding skills on their own develop incorrect stroking patterns that are inefficient and are difficult to correct at a later date.

Benefits of Acquiring Keyboarding Skills: Implementing keyboarding instruction benefits students and schools because it

- Uses students' time wisely,
- Offers effective use of school equipment,
- Supports improved language arts skills,
- Supports improved handwriting,
- Expands students' interests and likelihood of success in other subject areas, and
- Lays the foundation for a vital lifelong skill.

Uses students' time wisely. Good keyboarding skills allow students to use their time more wisely than if language arts assignments were completed using handwriting or poor keyboarding methods. Students who use the touch keyboarding system for the writing process have more time to spend in problem-solving activities that are basic to the composition process.

Offers effective use of school equipment. Computer time is generally limited for students and is too valuable to be wasted by students who have not learned touch keyboarding. Keyboarding instruction lets students be more productive when they use computers.

Supports improved language arts skills. Numerous studies have shown that keyboarding has positive effects on spelling, reading/writing, and other language arts skills. Generally, both teachers and students prefer assignments that are typed to handwritten assignments.

In the writing process, computers allow students to insert, delete, rearrange, and complete the final polishing of their work with minimum effort. When students are able to type at a rate which exceeds their handwriting speed and are able to save their work, they are more willing to proofread and edit their writing. With access to word processing, students are more eager to complete revisions, thus improving their writing skills. Generally, students who have learned to keyboard are more interested in the quality of their work. They are able to concentrate more on concepts, and they develop skills in other applications more easily than students who have not acquired keyboarding skills.

Supports improved handwriting. Although some educators have expressed concern that the introduction of keyboarding might detract from handwriting skills, the reverse appears to be true. Research shows that typewriting instruction had a favorable effect upon the quality and the speed of handwriting with an experimental group of fifth-grade students (see Unit 2). Additionally, it is recognized that keyboarding helps students improve finger dexterity, eye-hand coordination, and muscle coordination—all important requisites for the development of good handwriting skills.

Expands students' interests and likelihood of success in other subject areas. Computer programs are available for almost all subjects in the curriculum. Knowing how to use a computer or typewriter helps students become independent learners. Keyboarding skills allow students to develop self-reliance, form systematic work habits (such as following directions and working without teacher assistance), and accept personal responsibility for setting goals, completing projects, and evaluating their work.

Lays the foundation for a vital lifelong skill. Most employment projections show that the majority of today's elementary students will need to use computers on their jobs. Thus, keyboarding is a critical skill students will need for their future. Students who use computers or typewriters without learning proper keyboarding techniques do not use their time wisely. If students already are using computers or typewriters without first learning the touch system of keyboarding, it is essential to implement a keyboarding program immediately. Delay in implementing keyboarding instruction for these students directly affects the degree of difficulty they experience to overcome the bad habits that interfere with mastery.

Summary. Schools must make plans for students to acquire keyboarding skills before they use computers for more than single-key responses or before they use typewriters. In cases where students are using computers and typewriters without prior keyboarding instruction, it is imperative to implement a strong keyboarding instructional program immediately. Developing good keyboarding skills ensures wise use of students' time, offers effective use of school equipment, supports improved language arts skills, supports improved handwriting, expands students' interests and the likelihood of success in other subject areas, and lays the foundation for a vital lifelong skill. There is no substitute for getting students off to the right start by ensuring that they are provided the keyboarding instruction necessary to develop keyboarding mastery prior to using computers or typewriters. In cases where students are currently using equipment without the benefit of prior keyboarding instruction, there is no substitute for addressing keyboarding instruction immediately.

KEY NOTES FOR KEYBOARDING

Section 2: When to Teach

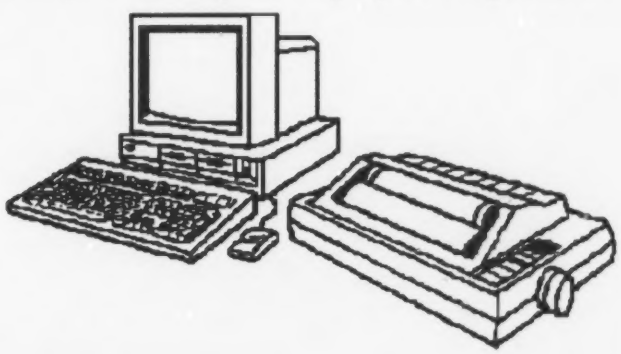
Efficient keyboarding skills are prerequisite for efficient operation of the computer. As school districts make plans to implement keyboarding instruction, an important factor to consider is the grade level where the initial instruction will be delivered.

Grade Level Considerations. While research studies support the benefits of introducing keyboarding at the upper elementary level, it is imperative that youngsters be provided keyboarding instruction prior to consistent use of computers, at any grade level.

It is frustrating for students at any grade level to effectively use equipment without appropriate training. Thus, the debate over which grade level is most appropriate for the introduction of keyboarding is of less importance than coordinating that instruction to reach students prior to consistent computer or typewriter usage.

Although exceptions exist, research supports the introduction of formal keyboarding instruction no earlier than grade three. The development of correct keyboarding techniques can be successfully achieved by most students at that grade level. Generally, students at third and higher grade levels are more physiologically ready to learn keyboarding than students at lower grades and preschool levels. Students below the third grade typically do not have the dexterity and hand size to manipulate the keys effectively. If students below third grade consistently use computers for more than single key responses, such as "Y" for "Yes" and "N" for "No," keyboarding instruction should be provided to them. While there is documentation of very young children learning to keyboard successfully, there is consistent support for overall student success when initial keyboarding instruction is provided to students in grades three and above.

If Computer Access Has Been Available Without Prior Keyboarding Instruction. In many schools, students already have had access to computers or typewriters without the prior benefit of keyboarding instruction. When the focus has been on computer use—no matter what the grade—and keyboarding instruction has not been a prerequisite, it is essential for educational leaders to redirect the focus of the computer use to implement keyboarding instruction. After the completion of the keyboarding instructional program, students will be able to accomplish more in the computer time allocated than was possible prior to receiving keyboarding instruction.



KEY NOTES FOR KEYBOARDING

Section 3: Curriculum Design

The keyboarding curriculum should be carefully planned, implemented, and articulated. The objectives for student achievement in the introductory keyboarding course should be determined from the instructional goals that are established.

At the elementary school level, the focus of keyboarding instruction generally is basic skill mastery to develop speed and accuracy using the touch system. The formatting of documents is not strongly emphasized and often is limited to those formats required to produce class assignments.

Introductory keyboarding courses at the middle school also tend to focus on basic skill mastery. For students entering middle school with prior acquisition of basic keyboarding mastery, the focus should be to improve speed and accuracy and to expand formatting skills. Middle school keyboarding courses usually include more formatting than courses at the elementary school level.

Advanced courses generally presuppose basic keyboarding mastery and formatting experience. Advanced courses usually focus on complex formatting, document production, and skill improvement. Advanced courses generally are offered at secondary and post-secondary institutions. Since not all students entering secondary and post-secondary institutions have acquired basic keyboarding mastery, it is essential that these institutions continue offering introductory keyboarding courses.

Once keyboarding skills have been acquired, students must be provided with opportunities to use these skills regularly. At the elementary school level, learning the writing process and completing a variety of language arts, social studies, and other writing assignments provide students ideal opportunities to use keyboarding skills. For the best overall success of keyboarding instruction, it is essential to articulate keyboarding programs from one grade level to the next and to schedule reinforcement activities regularly as an ongoing process at all grade levels (elementary through post-secondary).

KEY NOTES FOR KEYBOARDING

Section 3: Curriculum Design

The Introductory Course. Design of the introductory keyboarding course follows the basic principles of curriculum design: define the outcomes necessary (the objectives) and design the course to meet the objectives; plan how to conduct the course; decide how to validate the course (measure the results against the objectives); and plan a method to update the course in order for students to better meet the objectives.

Because there has been a keen focus on keyboarding instruction at elementary and middle schools for several years, curriculum materials for the introductory keyboarding course are readily available from publishers and state educational resources. In keeping with the purpose of this document to support but not duplicate information that is available from various sources, the focus of this section offers general information for the introductory keyboarding course.

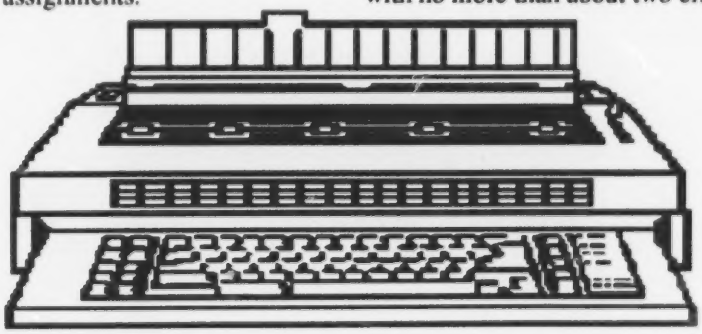
Course Length. A strong introductory keyboarding course of approximately 25 hours of instruction can be effectively implemented in eight to nine weeks by scheduling approximately 35 to 45 minutes for daily instruction. This amount of time is adequate for well-prepared teachers to cover "getting ready" time and to provide a minimum of 30 minutes for teacher-directed instruction.

Some elementary districts are committed to semester-length courses. When this is the case, the focus after the initial eight to nine weeks of instruction should be use of the newly acquired skill to produce language arts, spelling, social studies, and a variety of other written assignments.

Goals. The goals for introductory keyboarding courses of eight to nine weeks in elementary and middle schools should focus on the development of good techniques, speed, and accuracy. Students also should be able to demonstrate the basic operation of the computer or typewriter to produce class assignments.

The initial emphasis should be on keyboarding technique. Students should demonstrate the use of good techniques, such as keeping eyes on copy, using correct fingering, proper keystroking, etc. Experts agree that developing good techniques is more important than emphasizing either speed or accuracy. Keeping eyes on copy appears to be one of the most critical techniques for students to master. Development of good techniques lays the foundation for subsequent development of both speed and accuracy. The next focus should be on speed—being able to move the fingers rapidly. Practicing the use of good techniques and rapid finger movements helps students achieve greater accuracy in keyboarding.

In addition to demonstrating good techniques using the touch method of keyboarding, students should key at a minimum of 25 gross words a minute with no more than about two errors on one minute



timed writings. Keying with complete accuracy should not be a goal because this inhibits the development of speed. On modern equipment, error correction is an easy process that can be accomplished rapidly. Use of the correction key should be introduced after students have achieved a minimum speed of 20 words a minute. Note that the minimum speed is just that—a minimum. Since students tend to reach teacher expectations, higher goals generally will result if students are coached to reach them. Average speeds of over 70 gross words a minute have been documented by elementary students (see Unit 2, Section 2).

The sequence of instruction should be from easy to difficult, from simple to complex, from known to unknown or new. New keys should be introduced and reinforced by combining them with previously-learned keys. Generally no more than two new keys should be taught at a time. Assignments should relate to the appropriate grade level and focus on "need to know."

Strategies should be implemented to involve students with their own learning process. Technique charts can be used from the earliest stages of instruction. Samples are often included with software packages or textbook materials. Have students keep their own charts to record their own progress. This will help them become involved with their own learning process. At first, only speed should be recorded. As speeds approach about 25 words per minute on one minute timed writings, it is appropriate to begin recording accuracy scores. As the chart progresses upward, student motivation generally increases. For additional motivation, compare handwriting speed (words per minute) with typing speed (words per minute). Provide rewards for good performance, such as certificates, stars, stickers, and the like. Refrain from student competition, but rather, promote group cooperation.

Students should be directed when to use the correction key and when not to use the correction key. Generally, the correction key is used for writing assignments and is not used for drills that focus on speed building.

The use of keyboarding skill allows students to keep closer pace with their thoughts than when they use handwriting, and their hands do not tire so quickly. Therefore, it is appropriate to expect that students who achieve at least the minimum level of keyboarding skill will improve their language arts skills (spelling, reading, listening, and writing) to a greater degree than those students who do not learn keyboarding.

Evaluation. Evaluation should focus both on the learner and on the course. The learner should be able to demonstrate mastery at the required level (see Goals in this Section). If mastery is weak, remedial activities should be provided to students, and improvements to the course should be implemented to ensure that students gain greater learner mastery during subsequent course offerings.

Technique Goals

1. **Correct Body Position**
   - a. Fingers curved and upright lightly on the home keys.
   - b. Body is centered in front of the keyboard.
   - c. Forearms nearly parallel with the slant of the keyboard.
   - d. Elbows hanging naturally near the sides of the body.
   - e. Eyes on textbook or screen.
   - f. Feet on the floor, slightly apart.
2. **Correct Keystroking**
   - a. Curved fingers.
   - b. Upright fingers (not leaning over onto the little fingers).
   - c. Quick, snap keystrokes (fingertip snaps toward the palm.
   - d. Low, relaxed wrists.
   - e. Hands almost motionless (fingers do the reaching).

KEY NOTES FOR KEYBOARDING

Section 3: Curriculum Design

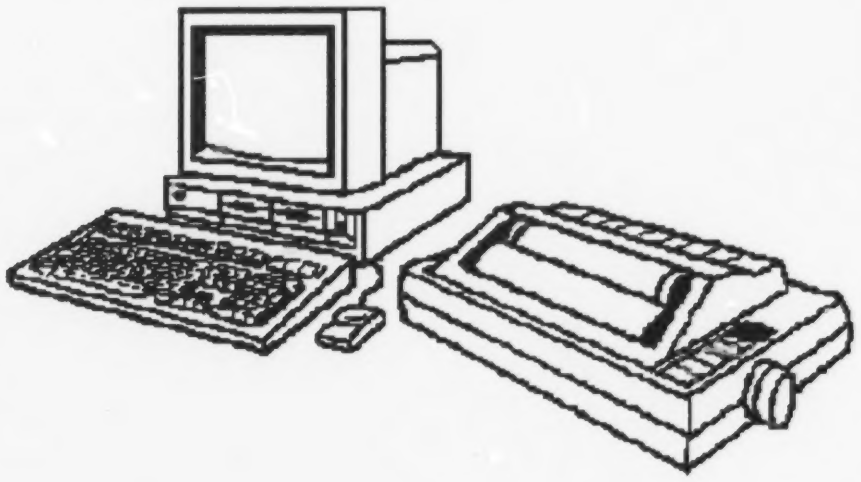
Reinforcing Keyboarding Skills. Once students complete the initial keyboarding instruction, introduce reinforcement activities at regular intervals. Keyboarding skills improve little or abate without consistent reinforcement. Teachers at the grade level where keyboarding is introduced—and at all levels above, no matter what subject they teach—should be trained to provide reinforcement activities wherever computers or typewriters are used in the curriculum.

Teaching students to keyboard, and then failing to provide adequate reinforcement and application opportunities is somewhat like teaching students to read and then not providing books, opportunity, or motivation for them to read afterwards.

Keyboarding reinforcement exercises should be introduced regularly. Reinforcement exercises generally are available in keyboarding texts and software. Following the initial keyboarding instruction, it is appropriate to provide reinforcement exercises on a weekly basis. Later, the reinforcement exercises can be scheduled every two to three weeks. In addition to activities that you might find in the instructional material being used, there are a variety of reinforcement activities that are easy to use.

Easy-to-Use Technique Reinforcement. Ask students to team with each other to provide ongoing technique support. Students then coach each other when incorrect techniques are observed. Form new teams from time to time.

Using familiar material, assign a specific technique, such as eyes on copy, on which students concentrate for a brief span of time, such as 15 seconds. Ask for a show of hands by students who judge that they accomplished the goal of successfully. Repeat each technique two or three times before continuing to a new technique. Cover a total of about four different techniques in this manner so that students build greater endurance without becoming exhausted.



Assign a specific technique similar to the previous activity but have students take turns observing each other and then providing verbal feedback (critique) about the correct/incorrect use of the technique specified. Coach students to provide specific information rather than general information to each other about what was correct or incorrect.

Easy- to-Use Speed Reinforcement. Alternate-hand or balanced-hand drills, in which alternate fingers of each hand are used to key the words, help develop speed because the words making up the copy are easy to type with speed. Speed increases as students master the word-level keyboarding skills needed keying balanced-hand words.

Have students key as rapidly as possible for 10 to 15 seconds using familiar alternate- or balanced-hand drill material. Then have students shake their hands briefly at their sides. Ask students to key the same material again (for the same length of time) while they try to key further than the first time—even just one stroke more. Have students select a different part of the familiar material and repeat the process—again pushing to get further the second time. Do this for five or six different selections, asking students to push for greater speed the second time they key each drill.

Easy-to-Use Accuracy Reinforcement. Accuracy, often a state of mind, emerges when a typist or keyboarding operator develops and refines the needed keyboarding techniques and then keys from copy or keys to originate text with confidence. At this point, and only then, does accuracy improve. Even then, other factors influence accuracy. These other factors include fatigue, ability to read copy, and concentration.

A simple accuracy drill that focuses on concentration can be adapted from the activity described in Speed Reinforcement. Have students complete four or five drills in this manner: key familiar material two times for speed (trying to get further the second time), then key the same material a third time for accuracy. Instruct students to concentrate on keying as accurately as possible the third time for each drill. When several brief speed drills are followed by brief accuracy drills in this way, most students will key almost the same amount for accuracy as they did for speed—and with good accuracy control. Vary the drills so students do not become tired or bored.

KEY NOTES FOR KEYBOARDING

Section 3: Curriculum Design

Articulation. Articulation within and among all levels of education is essential to establish, review, and improve the achievement objectives that are addressed between and within each educational institution.

Articulation. As districts address the issues associated with keyboarding instruction, the focus should be on establishing a strong, articulated keyboarding program which provides students the opportunity to improve keyboarding skills at each level. For a strong keyboarding program, it is important to communicate with all personnel who will be affected. Consider the need to involve school administrators, elementary language arts teachers, computer teachers, parents, and business education teachers in local district planning.

Follow the initial communication by establishing a curriculum committee of selected representation from the various personnel. The curriculum committee should establish appropriate goals and objectives for each grade level.

All keyboarding curriculum committee members should actively participate in advisory capacities and should meet regularly. The curriculum committee should include teachers and administrators who represent the level at which the introductory keyboarding course will be implemented. The curriculum committee also should include teachers and administrators who represent higher grade levels within the institution introducing keyboarding and higher levels of educational institutions. Support and commitment are vital to ensure ongoing success of the program.

Identify appropriate uses of keyboarding skills at each grade level, starting with the grade at which keyboarding is introduced. At the elementary level, using keyboarding skills for spelling, language arts, social studies, and other writing activities would be appropriate.

As part of the articulated plan, it is essential to develop a keyboarding reinforcement plan throughout the initial and subsequent years. It is equally essential to develop an articulated plan that establishes the content of the initial and subsequent keyboarding courses. Establishing these articulated plans will enable teachers at all levels to become actively involved with the improvement of keyboarding skills and will enable secondary and post-secondary institutions to provide more advanced instruction for those students entering with basic keyboarding skills in place.

KEY NOTES FOR KEYBOARDING

Section 4: Coordinating the Effort

The most successful keyboarding programs involve the cooperative efforts of administrators, elementary/middle school teachers, secondary and post-secondary business education teachers, parents, the community, and the keyboarding teachers. This team effort ensures support for coordinating the development, implementation, and ongoing updating processes of a successful keyboarding curriculum.

KEY NOTES FOR KEYBOARDING

Section 4: Coordinating the Effort

Local Support for Keyboarding. Successful keyboarding programs can be implemented and maintained with leadership limited to enthusiastic, well-trained keyboading teachers. However, the involvement of local support from administrators, teachers, and parents for the keyboarding effort, along with the establishment of an advisory committee, ensures greater success for keyboarding programs.

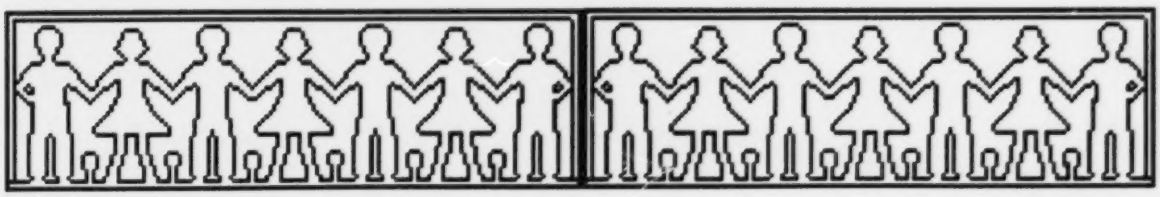
The Administrator. As with other endeavors at educational institutions, the role of the administrator is very important to the success or failure of the elementary/middle school keyboarding program. For success, the administration must demonstrate that it gives high priority to the importance of keyboarding in the curriculum. Additionally, the administration should

- Provide access to the necessary facilities, supplies, and equipment for initial instruction and ongoing use,
- Select, recruit, or provide training of a qualified teacher to teach the keyboarding program,
- Provide for ongoing training and staff development as needed,
- Mobilize faculty and community support for the keyboarding program,
- Maintain support for the overall strategic direction to coordinate keyboarding with the total curriculum,
- Support the evaluation and modification/expansion of the program on an ongoing basis.

The Elementary/Middle School Teacher. The primary role of the elementary/middle school teacher is to support the keyboarding program. If computers or typewriters are in classrooms, elementary/middle school teachers should become knowledgeable about keyboarding instruction even if they are not the prime deliverers of that instruction. This is essential in order to reinforce good techniques. Similarly, if computers or typewriters are in labs, the lab staff should be trained so they can reinforce good techniques. Additionally, the elementary/middle school teacher should

- Actively support infusing keyboarding and computer applications throughout the curriculum,
- Provide opportunities for students to use their keyboarding skills by requesting typed or printed assignments,
- Participate in staff development activities related to keyboarding and computer technologies.

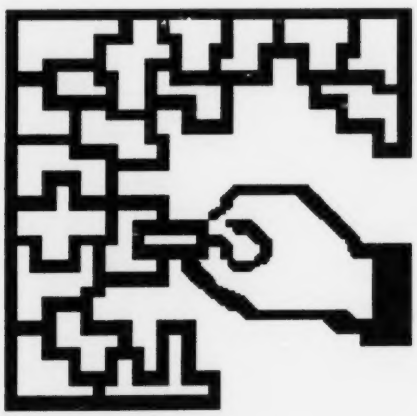
The Business Education Teacher. As a resource person, the business education teacher is able to provide support and assist



with articulation among the various levels of educational institutions. The business education teacher can provide strong leadership by

- Conducting in-service programs for all levels of faculty,
- Assisting in the development of a comprehensive program involving keyboarding and computer applications across the curriculum,
- Serving and assisting with the coordination of advisory committee activities,
- Conducting keyboarding and related business classes,
- Promoting the spirit of networking and mutual cooperation to ensure the success of the keyboarding program,
- Promoting the concept of lifelong learning by being involved in professional development activities and organizations.

The Advisory Committee. The advisory committee has an important role in the elementary keyboarding program. Members should represent administrators and teachers from the various levels of educational institutions and the community. Some advisory committees show higher accomplishments when they are separated into smaller task forces with each group focusing on a specific aspect of the keyboarding program. Task force groups report to the committee on an established basis.



Advisory committees can

- Provide information on current technology and real world requirements,
- Promote the community involvement in the keyboarding program and the overall school program,
- Provide input for curriculum development,
- Assist in securing resources to support the program,
- Assist with reviewing, evaluating, updating, and articulating.

Parents. Parents have an essential role in the keyboarding program. Parents should support teachers and demonstrate an interest to their children. Parents have additional responsibilities if they have computers or typewriters that students use at their homes. When this is the case, parents should participate in in-service workshops designed to teach them how to reinforce correct keyboarding techniques.

Computer technology is an integral part of today's world. Parents and teachers alike must be willing to learn new skills and reinforce the use of technology in homes and schools. Parents should foster in their children the understanding that computer technology is bringing rapid change and innovation to our world—and continued learning will be the key ingredient for success in the future. The key focus for parents in keyboarding programs, as in other educational endeavors, is on support and involvement.

KEY NOTES FOR KEYBOARDING

Section 4: Coordinating the Effort

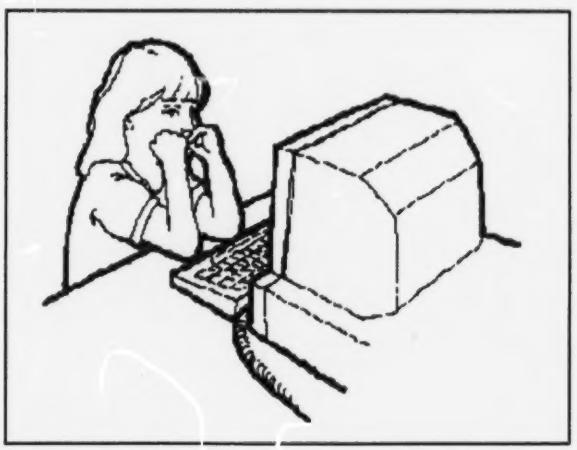
Role of the Keyboarding Teacher. Efficient keyboarding skills are prerequisite for efficient operation of the computer. As school districts make plans to implement keyboarding instruction, an important factor to consider is the grade level where the initial keyboarding instruction will be delivered. While research studies support the benefits of introducing keyboarding at the upper elementary level, it is imperative that youngsters be provided keyboarding instruction prior to consistent use of computers, at any grade level.

Keyboarding Taught by the Elementary Teacher. Most elementary teachers have not completed courses in how to teach typewriting/keyboarding. Therefore, before elementary teachers teach keyboarding, most need instruction in the teaching methodologies for teaching keyboarding. Because the teaching of keyboarding does not include teaching all the aspects of traditional typewriting instruction, such as a variety of formatting activities, the course designed for the elementary teacher to learn how to teach keyboarding may differ from the instructional course that is traditional for high school and postsecondary business education instructors. The local or state climate often dictates the length and content of such instructional courses designed for elementary teachers.

Whether the elementary teacher teaches keyboarding or not, it is valuable for the elementary teacher to have some training in methodologies for teaching keyboarding. Because the elementary teacher is with students on a daily basis, keyboarding techniques can be monitored closely during the initial and subsequent stages of the learning process. Additionally, the elementary teacher can support the improvement of keyboarding skills as an ongoing process.

Keyboarding Taught by The Business Education Typing/ Keyboarding Teacher. Secondary and postsecondary business education teachers who have completed course work on the methodologies for teaching typewriting/ keyboarding have the background in how to teach keyboarding. However, they generally have not completed coursework focused on teaching the younger learner as have elementary teachers. Therefore, secondary and postsecondary teachers who teach keyboarding to elementary students should complete course work dealing with teaching the younger learner. The local or state climate often dictates the length and content of such instructional courses designed for teaching keyboarding to elementary students.

Secondary and postsecondary business education teachers who teach keyboarding to elementary students generally have limited time in the elementary classroom. Therefore it



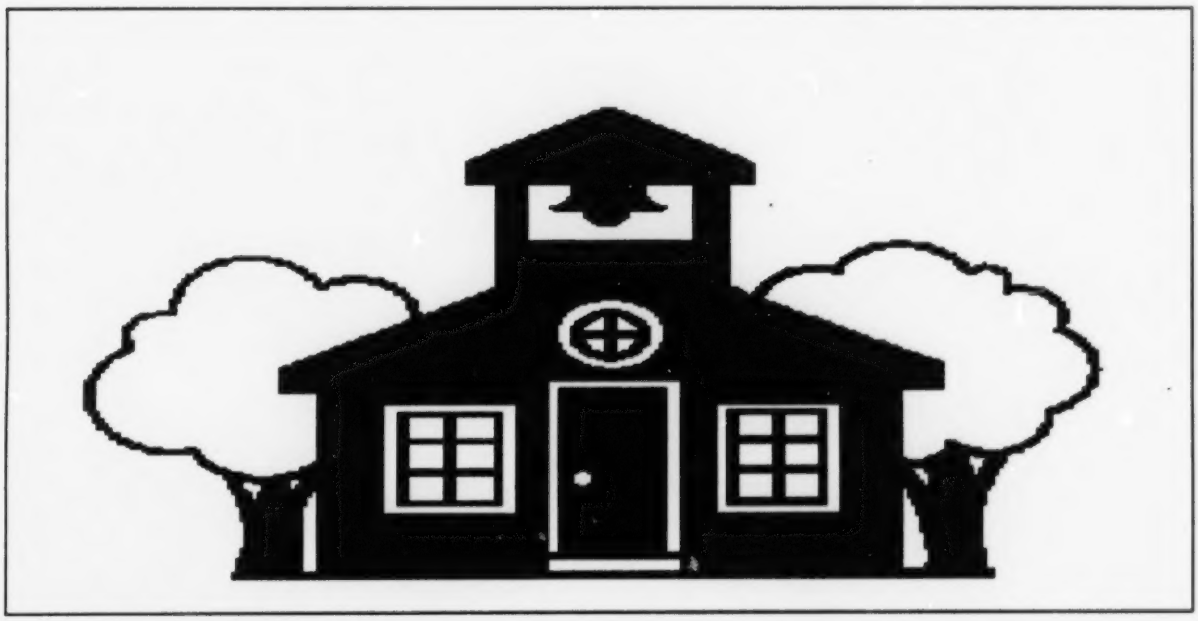
is important that elementary teachers or aides complete course work in which they learn the methodologies for supporting the learning of keyboarding so they can reinforce proper keyboarding techniques.

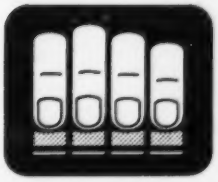
Keyboarding Taught by Others. In many districts, computer labs are established, and computer lab technicians are assigned to the lab. Groups of students rotate through the lab at specified times. Often the instruction and reinforcement of keyboarding is provided by the computer lab technicians who are qualified to teach keyboarding.

In some districts, computers are placed in each classroom rather than, or in addition to, establishing a computer lab. When this is the case, classroom aides should participate in course work that deals with reinforcing keyboarding skills.

Many students have computers in their homes. Therefore, it is important that parents and older siblings participate in an in-service that deals with reinforcing keyboarding skills.

Keyboarding is Everybody's Business. With the continued expansion of computer applications, keyboarding becomes everybody's business. The ability to use computers effectively and efficiently has become an important life skill for both professional and personal use.





KEY NOTES FOR KEYBOARDING

Section 5: Promoting Keyboarding

Once the keyboarding program has been implemented, promoting it becomes an ongoing process. School personnel, parents, and students are only a few of the groups to target as recipients of information about the keyboarding program. Activities should be implemented that involve teachers and students as well as administrators, advisory committee members, and others in promoting the keyboarding program.

Ways to Involve Your Students. One of the best promotions a keyboarding program can receive comes from enthusiastic, successful students. As they tell others about their class, it will gain a great deal of publicity. Since students are such a good source of publicity, involve them intentionally in the promotional efforts. Here are some suggestions:

- ***Memo pads.*** Have students use keyboarding skills to create memo pads for themselves or for others.
- ***Business cards.*** Have students create business cards for themselves, staff, family, or friends.
- ***Newsletters, fliers, brochures.*** Assist students in working with other class members, teachers, and/or administrators to create newsletters, fliers, or brochures which promote keyboarding.
- ***Service projects.*** Have students volunteer to help keyboard class projects, school projects, newsletters, or assignments composed by younger students.
- ***Keyboarding buttons or badges.*** Obtain buttons or badges that promote keyboarding. Wear them and distribute them for students and others to wear.
- ***Pencils, pens, key chains, etc.*** Order such items as pencils, pens, and key chains with messages imprinted on them that promote keyboarding. When possible, involve students in deciding on the items and the messages.
- ***Displays of student work.*** Arrange displays of students' keyboarding papers. Contrast work done by hand with work done on a typewriter or computer. Use the displays in class for students to enjoy and to create interest for visitors. Take such displays to share at workshops on keyboarding.
- ***Displays of keyboards.*** Arrange displays contrasting work done on different types of keyboards (typewriter and computer,) and printouts from different types of printers.
- ***Student-written correspondence.*** Have students keyboard responses to requests for information or thank-you messages to express appreciation for support, favors, or gifts.
- ***Student diaries/journals.*** Have students keep a diary of how they feel about learning to keyboard.
- ***Field trips.*** Organize class field trips to see "keyboarding in action" in other classrooms, in the district office, or in professional business locations.
- ***Videos.*** Show commercially prepared or locally developed keyboarding videos to the keyboarding class. Film your class to show to the students and to others.
- ***Open-door policy.*** Invite members of staff, administration, school board, media, and community to visit keyboarding classes.
- ***Special events.*** Host an open house, keyboarding day, skills contest, or keyboarding

fair. Sponsor both traditional and nontraditional special events from time to time to publicize your keyboarding program. Invite school personnel, parents, other students, representatives of the media, etc., to attend.

- ***Speakers' bureau.*** Form a speakers' bureau of students, teachers, parents, etc., who would be willing to talk about your keyboarding program.

Other Activities That Promote Keyboarding. There are many ways to involve others to promote keyboarding. Here are several ideas:

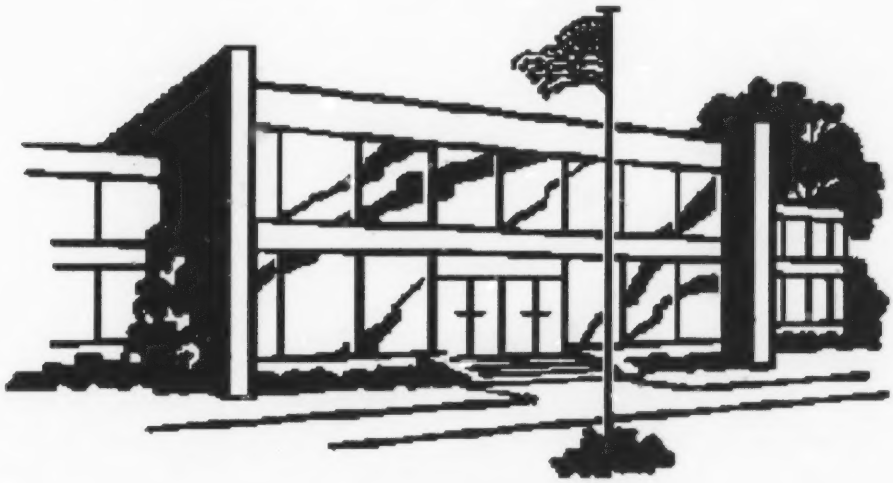
- ***Orientation sessions.*** Hold orientation sessions for new teachers and provide in-service workshops for teachers, staff, and parents.
- ***Staff meeting agenda item.*** Request that keyboarding be a regular agenda item for faculty meetings.
- ***School board meeting agenda item.*** Request time at school board meetings to explain the goals and objectives of the keyboarding program and to give periodic updates on the progress of the program.
- ***School committee meeting agenda item.*** Participate in groups, such as curriculum, computer, subject area, and administrative committees, to give input regarding keyboarding schedules, personnel needs, and program changes.
- ***Recruitment of students.*** Visit other classrooms to promote keyboarding courses. For example, visit students in younger grades who will receive training the following year or other students about to embark on keying class.
- ***Recruitment of volunteers.*** As you talk with parents and teachers who are interested in the keyboarding program, look for volunteers who are willing to assist in delivering instruction. Be willing to provide volunteer training as needed.
- ***Press releases.*** Write press releases and send them to newspapers, radio stations, and television stations. Learn the names of media representatives. Follow the mailing of press releases with phone calls to ask if the the press releases were received. Follow the publication of press releases with thank-you calls. For television stations, send a video of the keyboarding class in action along with a printed press release.
- ***Journal articles.*** Submit articles about the keyboarding program to professional journals and magazines with broad readership.
- ***Computer bulletin board announcements.*** Publicize the keyboarding program to computer users through announcements on computer bulletin boards.
- ***Workshops.*** Attend workshops sponsored by publishers and professional groups; additionally, develop and present your own workshops to promote keyboarding.
- ***Presentations to community groups.*** Volunteer, when appropriate, to give presentations about the keyboarding program to special interest groups.
- ***Idea file.*** Develop a file of ideas to show how keyboarding could be included in teacher lesson plans and volunteer to help other teachers with implementation.
- ***Bibliographies.*** Compile bibliographies and sources of keyboarding information to share with others.
- ***Willingness to help others.*** Keyboarding gives you an opportunity to become known for your willingness to share materials and respond to others' requests.

Keyboarding for All

KEY NOTES FOR KEYBOARDING

Section 6: Classroom Management

This section provides information about the selection of equipment, desks and chairs, use of textbooks, use of software, andclassroom configuration. All of these affect the overall management of the classroom in which keyboarding is taught.



KEY NOTES FOR KEYBOARDING

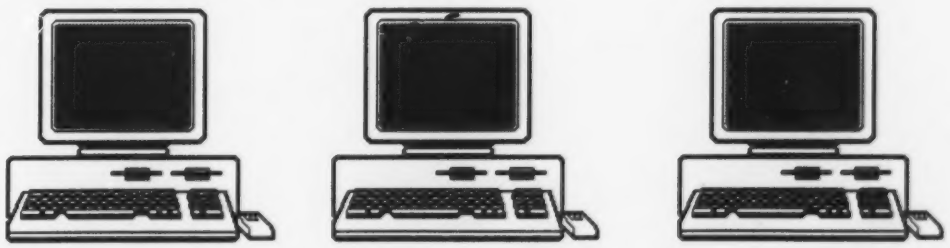
Section 6: Classroom Management

Use of Equipment. There are many options for the equipment that is used for the introductory keyboarding course. If the equipment is to be used only for keyboarding instruction, it does not need to have as much capability as would be the case if it were to be used for additional applications. Several options are available–even with limited budgets and small classrooms.

Base your equipment and facility decisions on the question, "How is the keyboarding to be taught—on an individual basis, in small groups, or to an entire class?" Ideally, the entire class is taught at the same time with each student having access to a computer or electronic typewriter. Students cannot learn to keyboard by pretending on paper charts or by sharing a keyboard with a fellow student. If computers are not available for each student, electric or electronic typewriters may be used as an interim supplement. Manual typewriters are inappropriate for elementary students. Students learning to keyboard should print their work from time to time. Students, teachers, and parents want to see the work accomplished in the keyboarding class.

Ideally, a designated classroom should be provided. An interim solution may be to group classroom computers in a laboratory during keyboarding instruction. Some districts have successfully implemented keyboarding programs utilizing battery-operated portable electronic typewriters which are moved from classroom to classroom on an equipment cart. Whichever approach is used, the following list of equipment will serve as a guide:

- A computer (networked or with disk drives) or electronic typewriter for each student
- Printer access for computers (this may be shared)
- Adjustable and movable desks and chairs
- Sufficient electrical outlets
- Power surge protectors for computers
- Demonstration computer or typewriter
- A master electrical switch
- Dry marker board with markers (chalk dust is harmful to computers)
- Computer covers, preferably made of cloth
- Storage space for student disks, computer paper, software, and other supplies.



KEY NOTES FOR KEYBOARDING

Section 6: Classroom Management

Selection of Desks/Chairs. In every class, there are considerable variations in the sizes of students. In keyboarding classes, it is especially important to accommodate the physical size of each student to ensure that proper keyboarding techniques can be learned. Adjustable tables and/or chairs provide a common way to accomplish this. If adjustable tables and chairs are not available, alternatives can be employed to accommodate each student.

Adjustable computer desk modules and chairs or adjustable tables and chairs provide optimal work stations. When these cannot be accommodated in a classroom, shelving around the perimeter of the room (one lower "desk" shelf to accommodate the keyboards/monitors and a higher shelf to accommodate the disk drives and printer) may be an acceptable alternative. When this alternative is implemented, it is essential that adjustable chairs are used. The remainder of the room could then be utilized for additional computer stations consisting of movable, adjustable desks and chairs.

Angles, distances, and copy type size are central to learning conditions for keyboarding. The slant of the forearm should parallel the slant of the keyboard. Adjustable tables and chairs are needed to accommodate different heights of students. If these are not available, consider using books to raise students to the proper level for keying and foot blocks for correct foot placement.

Reading, whether from a screen or printed page, is done most efficiently and with minimum eye strain when the line of vision from the eye to the copy is at an angle approaching 90 degrees. Keyboard operation is most efficient and least stressful when backs of the hands and forearms are parallel to the upward slant of the computer/typewriter keyboard.

KEY NOTES FOR KEYBOARDING

Section 6: Classroom Management

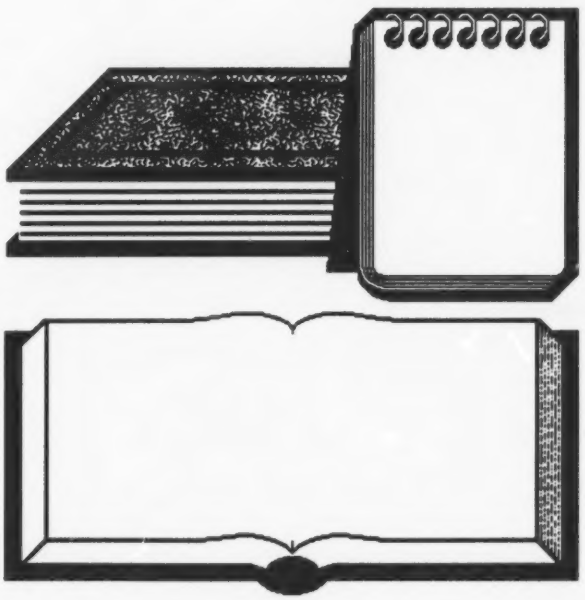
Use of Textbooks. In reviewing keyboarding textbooks for introductory keyboarding instruction, there are several factors to consider. This section provides several considerations that should be addressed during the selection process.

In dealing with early elementary school children, attention span is a major factor for consideration. You can have the most attractive software in the world, but the attention span of a third grader, for example, will soon wane in spite of the student's initial attraction to the software program. Instruction requires variety in the drills and variety in the teacher-directed presentations. More mature students who are learning to keyboard also need variety but not to the degree of the younger student. A well-selected keyboarding textbook assists in providing the needed variety.

In selecting a keyboarding textbook, consider the following:

- At what grade level will the keyboarding class be taught?
- Is the reading level of the text suitable for the grade level, and is the size of the type appropriate for the student?
- Is the textbook sturdy enough to withstand considerable use?
- Does the textbook stand by itself at the desk or must a typing stand be used to enable the book to sit at the proper level?
- Does each lesson presentation contain a suitable learning load?
- Are the illustrations suitable for the maturity of the class?
- Is the teacher's manual helpful in dealing with the maturity level of the students, and does it contain enrichment problems and teaching tips that can be incorporated into your lessons?
- In dealing with certain students (learning disabled, special education, etc.), are there a minimum of distractions on each page so that the student concentrates on what is to be learned?
- Are support services available to the teacher from the publisher?

During the textbook selection process, it is important to involve not only the keyboarding teacher but also the classroom teacher, computer coordinator, and school administrator.



KEY NOTES FOR KEYBOARDING

Section 6: Classroom Management

Use of Software. When computers are used to teach keyboarding, a variety of options are available. Word processing software can be used in conjunction with keyboarding textbooks. Keyboarding instructional software is another option. In either case, unless a computer network is used, a system should be planned to manage the software and students' work (data) disks.

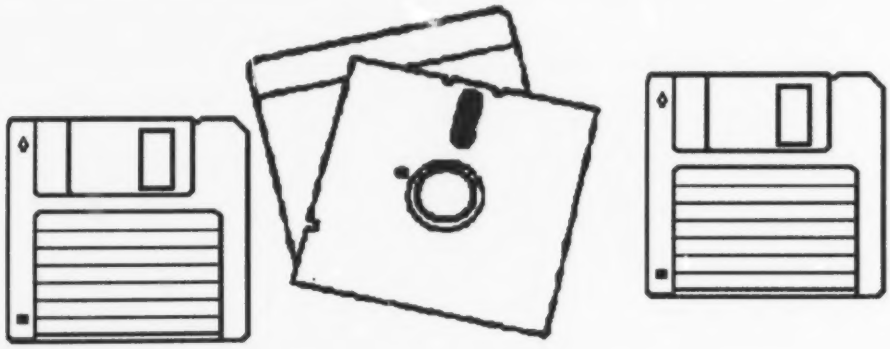
Word Processing. A variety of word processing programs are suitable to use for keyboarding instruction. In the introductory keyboarding class in which word processing software is used, instruction on software functions should be limited. At a later time, instruction on software functions can be expanded.

In selecting word processing software for keyboarding instruction consider the following:

- Is the software for the keyboarding class going to be used for other instructional activities?
- Is the software easy to use—that is, will students be able to access the program quickly so that getting-ready time will be brief?
- Is the software manual well written in simple terms so teachers who are unfamiliar with the program can learn it quickly?
- Are local "experts" available who can assist teachers learn how to use the software?
- How much does the software cost?
- Will original copies of the software be required for each computer, or can the same disk legally be used in more than one machine?
- If computers are already available, is the software compatible with the computers?

Consider evaluating both commercial word processing software and shareware word processing programs. Many districts have computer resource staff who can provide information about various programs in these two categories. Additionally, software stores and computer magazines are good resources for information that can assist in the decision-making process. Local computer users groups also are likely resources for software information.

It is beneficial for schools within districts to use the same software. When this is the case, it is possible for teachers to share successes and assist each other more easily.

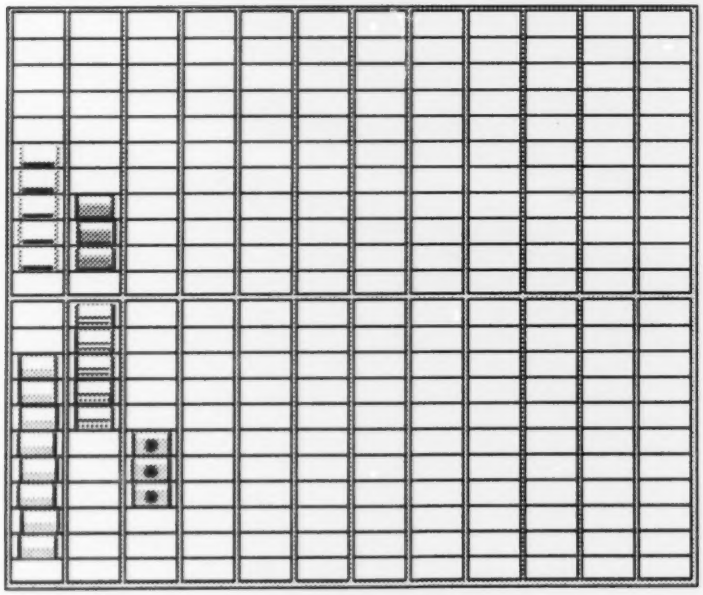


Keyboarding Software. Many programs are available that are designed to teach keyboarding. While some of the keyboarding instructional software is excellent, it is important to understand that keyboarding software should not replace the keyboarding teacher. Learning proper keyboarding techniques is vital. Students must be observed and coached as they learn keyboarding, and keyboarding instructional software cannot perform this function. As instructional software is reviewed, note that audible sounds are made by some keyboarding software when an incorrect key is pressed to indicate an error was made. If there is not a way to turn off the sound, this sort of keyboarding instructional software is not a wise choice for most students because an early focus on accuracy inhibits the development of keyboarding speed. Most keyboarding professionals agree that keyboarding software is excellent for reinforcement; and when it is employed for the initial keyboarding instruction, it should be accompanied by teacher-directed activities.

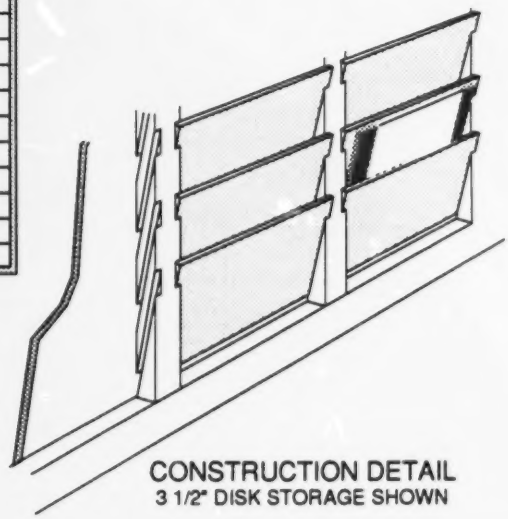
In evaluating the programs that teach keyboarding, review and use appropriate criteria suggested in Section 6.3 on selecting a keyboarding textbook.

Disk Management. Disk management is an important part of classroom management. Students should each have data disks on which to store their assignments. The software for each machine and the students' data disks can be stored in disk storage boxes and kept at each computer. Having these at each computer saves time because the disks do not need to be handed out and gathered each time they are used. If space is limited at each computer, another option, though less efficient, is to store the disks in cabinets or in wall storage units.

Wall Mounted Disk Management System



FRONT VIEW



CONSTRUCTION DETAIL
3 1/2" DISK STORAGE SHOWN

KEY NOTES FOR KEYBOARDING

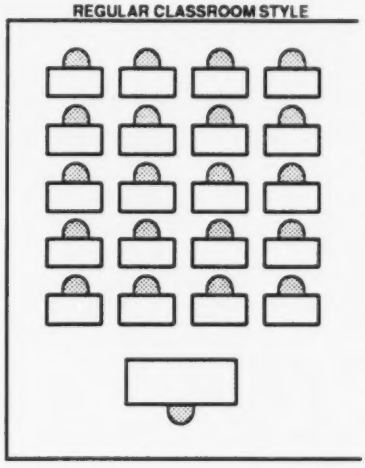
Section 6: Classroom Management

Classroom Configuration. Several factors affect the configuration of desks and equipment in the classroom. These include the size of the room, the number of students, the kind of equipment, and the quantity of the equipment. The visual connection between the teacher and the students, and students and the teacher, is a key factor in arranging the equipment for the introductory keyboarding class. The effective keyboarding teacher should be able to observe individual student responses to instructions and students should be able to observe and imitate teacher demonstrations with unobstructed visual contact. Additionally, the classroom configuration should provide the keyboarding teacher with easy access to individual students as they work.

Four classroom arrangements for the introductory keyboarding course are common—the traditional classroom layout, the parallel layout, the chevron layout, and the U-shaped layout.

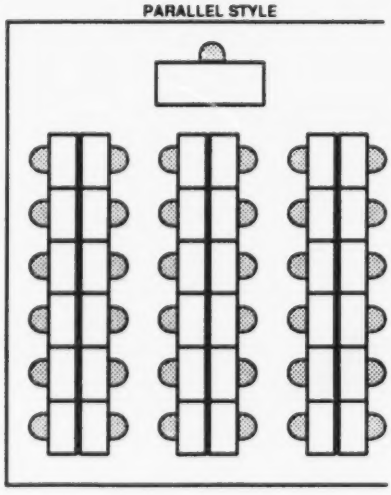
Traditional Classroom Layout. Traditional classroom layout is generally used for classes in which typewriters are used for keyboarding instruction. However, this style is not as effective with computers because students cannot see the teacher without looking around the equipment (see Traditional Style illustration). Additionally, it is difficult to monitor students because the teacher cannot see students' hands or the screen. When desks are placed close together, there is limited opportunity to physically move to individual students, thus making it difficult for the teacher to confirm, correct, and coach students one-on-one.

REGULAR CLASSROOM STYLE

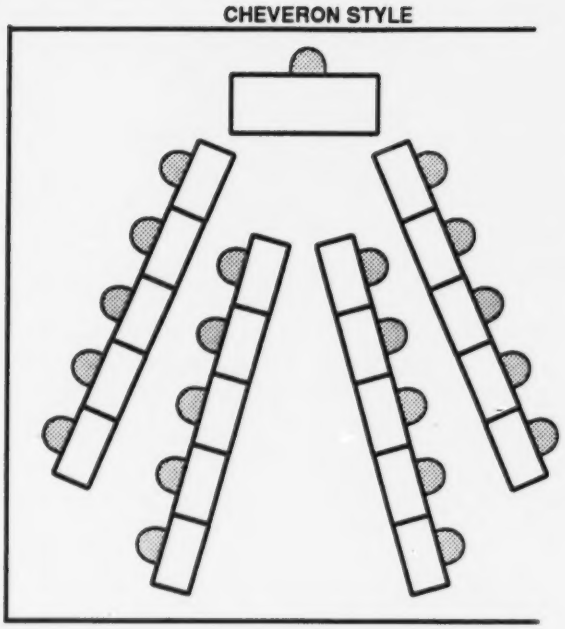


Parallel Layout. The parallel style of classroom layout makes efficient use of space because rows of desks face each other. However, visual contact between the teacher and students is hampered from several locations (see Parallel Style illustration).

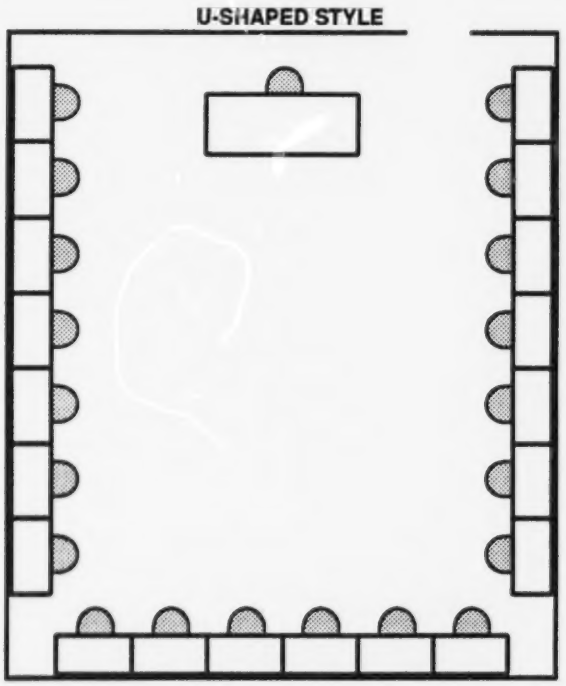
PARALLEL STYLE



Chevron Layout. The chevron layout is an effective arrangement when computers are used,(see Chevron Style illustration). Students can see teacher movements and the teacher has a good view of the students' hands on the keyboards. This layout lets the teacher move among the students easily. A disadvantage is that more space is required for this configuration. That is, not as many computers can be placed in the room as with the traditional classroom layout.



U-Shape Layout. The U-shape layout allows the teacher to view the keyboards and screens from one location(see U-Shape Style illustration). This style also is likely to utilize existing power outlets efficiently. Tables can be placed in the open center space of the classroom to utilize the space for desk work activities, or the space can be used for book shelves and storage units. The U-shape is not very effective for initial keyboarding instruction because students have to turn to watch demonstrations by the teacher. Additionally, the teacher cannot see the eyes of students to check that they do not watch the keys. Where there are two labs, one could be arranged in the chevron style to use for initial keyboarding instruction, and the other could be arranged in U-shape for more advanced work.



KEY NOTES FOR KEYBOARDING

Section 7: Fundamentals

Introduction. In teaching keyboarding, the learning emphasis should be on the elements of keyboarding that "make a difference." Conversely, all teachers should discard those procedures or directions that actually have a deterring effect on the development of keyboarding skill. For example, in teaching the letter keyboard, emphasis should be on the ***process*** (how the student keyboards) rather than on the ***product*** (what the student types). This statement means that keyboarding or typing errors should be ignored, except students should not type "gibberish." Errors made by students as they learn the keyboard are known as "chance errors." Such errors will disappear as students master the keyboard.

Maximum skill gains, then, are made when the learning emphasis is placed on the fundamentals or techniques and conditioners of keyboarding skill. Since students must understand the skill behavior or modifications required to develop and refine keyboarding techniques, it is helpful if the teacher can demonstrate such techniques and observe the students as they imitate the teacher's demonstration. A series of brief discussions of the techniques and conditioners of keyboarding skill are contained in this section.

BEST COPY AVAILABLE

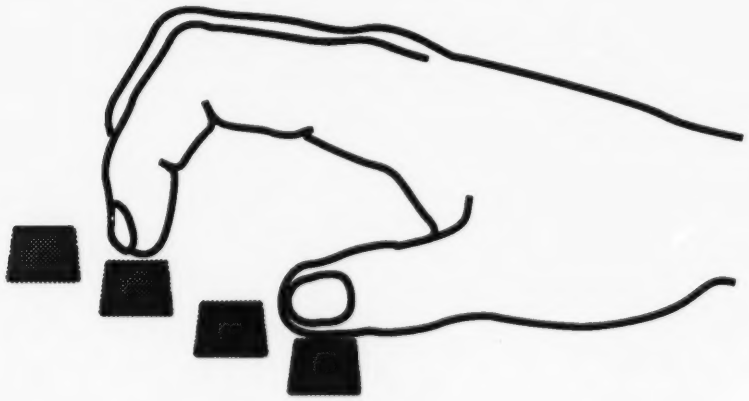
KEY NOTES FOR KEYBOARDING

Section 7: Fundamentals

Technique #1: Proper Hand and Finger Position. Maintaining proper hand and finger position with the fingers in home-key position is crucial to the development of keyboarding skill. From this position, all key reaches can be made with the finger-action keystroking. Waste motions are eliminated.

The students should be taught to place their fingers over the home keys (asdfjkl;) in a curved and upright position (see illustration). Proper position dictates that the tips of the fingers, the base of the hands, and the lower arms should be parallel to the slant of the keyboard or keypad. (An adjustable table is important.) The wrists should be kept low and relaxed with the base of the hands just off the keyboard frame. Both thumbs should be curved with the right thumb resting lightly on the spacebar so the spacing stroke can be made without waste motion.

Show the students this position as you place your fingers in home-key position to demonstrate. Have the students study good position as it is illustrated in the textbook being used. If a computer software keyboard learning package is used, have students study and imitate good position as shown on the monitor. As the students learn the letter keys, continue to emphasize the importance of maintaining good keyboarding position.



KEY NOTES FOR KEYBOARDING

Section 7: Fundamentals

Technique #2: Proper Keystroking. With the emphasis on the process (how the student types) rather than on the product (what the student types), good keystroking skills will emerge. With the development of proper keystroking, "chance errors" quickly disappear.

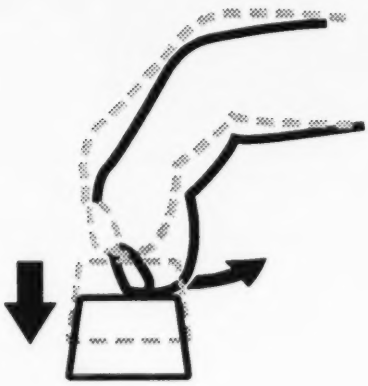
As students learn proper keystroking with the fingers close to the keys at all times, emphasize fast, finger-action keystroking. Students should learn to make a quick, snap keystroke—a slight, down-and-in motion of the finger (see illustration).

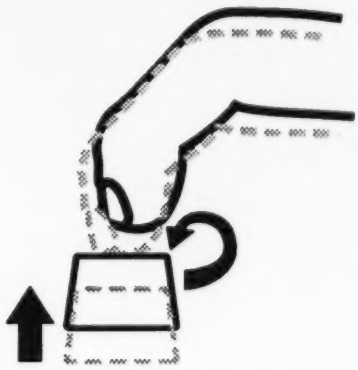
As the keystroke is made, the finger taps the key (electronic keyboards), or strikes the key (electric keyboards), with the finger moving slightly toward the palm of the hand as the quick key release is made. Hands, wrists, and arms should be held in a quiet position. The wrists should be low and relaxed with the base of each hand just off the frame of the keyboard or keypad.

Caution students not to watch their fingers or the keyboard as each key to be learned is struck with the proper controlling finger. Eyes should be on the keys only for initial key locations and then should be on the textbook (or the monitor, if a learning software package is being used).

After a preliminary home position drill to ensure that the controlling fingers are on the home keys, conduct a teacher-directed drill on keystroking on the home keys. Call each key and then have students respond as you say "tap" or "strike." Example: *j (tap) j (tap) j (tap)*; call other home keys in a similar manner. Remember that the keystroke should be made with speed as you say *tap* or *strike*.

Next, transfer good keystroking to drill activities on the home keys as given in the textbook or on the monitor, if a software package is used. In each new lesson, devote a few minutes to a teacher-directed review of keys learned. First, stress the individual key; then a word or words emphasizing the same key. Example: *e eke*.





KEY NOTES FOR KEYBOARDING

Section 7: Fundamentals

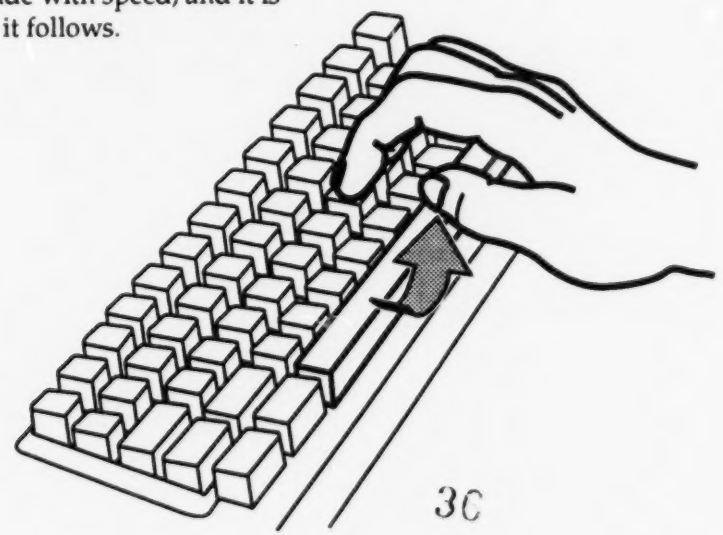
Technique #3: Proper Spacebar Control. In all probability, more waste motions are made in operating the spacebar than in operating other parts of the keyboard. Poor spacebar control reduces keyboarding speed. Give daily emphasis to proper use of the spacebar!

In developing proper spacebar control, the right thumb should be curved (toward the palm of the right hand), and it should be on or close to the spacebar at all times. This positioning of the right thumb reduces or eliminates waste motions.

Teach the students to strike the spacebar with a quick, down-and-in motion (toward palm) of the right thumb. As is true for keystroking, the spacebar should be released quickly. Make the spacing stroke a part of the word being keyboarded or typed. There should be no pause before or after the spacing stroke. (See illustration.)

If not properly taught and emphasized in each new lesson, keyboard operators develop bad habit patterns in their use of the spacebar. The spacing stroke is made with speed, and it is always part of the word it follows.

The proper technique for operating the spacebar should be introduced in the first lesson. Demonstrate (show) students proper spacebar operation. Have them imitate your demonstration. Pace students by a teacher-directed drill such as the following: Call "space;" then have students strike the spacebar as you say "strike." Walk around the classroom and observe students as you direct this drill. In later lessons, as you observe students and their use of proper technique patterns, check their use of the spacebar. Do whatever corrective practice is necessary; however, as is true with all technique patterns, technique skill is a skill that improves with purposeful practice. Refinement of technique skills leads to overall keyboard mastery.



KEY NOTES FOR KEYBOARDING

Section 7: Fundamentals

Technique #4: Control of the Return Key. As is true for other keyboard operating parts, the proper reach to the return key must be taught and re-emphasized in each of the letter keyboarding lessons. Students must learn to make the return reach without waste motion.

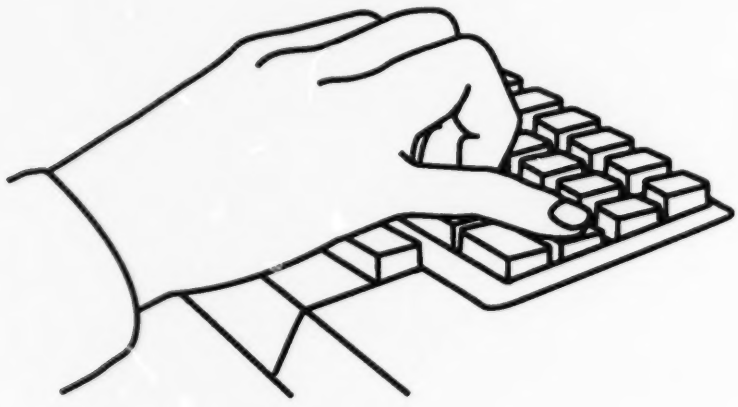
On the electric or electronic keyboards or keypads, the right little finger is extended to the return key to make the return to the new line. Students should be taught to try to keep the other fingers of the right hand in home position. Note: Computers and some electronic typewriters have an automatic return at the ends of lines.

As students make the return, they should make the effort to keep their eyes on the textbook copy, or on the monitor if a software package is being used. The technique to be taught is a quick return at the end of a line with an immediate start of the new line.

Teachers of keyboarding will find that frequent teacher-directed drills on the use of the return key will pay dividends in terms of improved keyboarding rates. Remember to stress the right little-finger reach with the other fingers held in typing position over the home keys. Students with small hands may need to lift the ring finger off its home-key position on the "L" key as the little finger is extended to make the return.

To stress the importance of a quick start of the new line as the return is made, have students type a letter or a word on the new line. For example, call *(return) j; (return) f;* and so forth. When students have learned enough letters to type words, call *(return) ask;* or *(return) he;* and so forth. Again stress that the word or phrase on the new line is keyboarded without pause.

As students practice drill materials from the textbook, observe them and make any needed corrections in the return technique being used. Textbooks may contain special return drills; use such drills for repetitive practice.



KEY NOTES FOR KEYBOARDING

Section 7: Fundamentals

Technique #5: Proper Control of Shift Keys. Three things should be emphasized as the shift-key reaches are taught: (1) the making of the reach to the shift key without waste motion; (2) the use of the proper shift key for making capital letters; and, (3) the elimination of pauses before or after the shift-key reach.

The technique to be taught in using the shift keys is a quick, little finger reach to the shift key with the proper controlling finger. Students should try to keep the other fingers in home-key position.

Students must learn that the left-shift key is used for making the capital of any letter key controlled by the fingers of the right hand; conversely, the right-shift key is used for making the capital of any letter key controlled by the fingers of the left hand. Observe students to make certain that the proper shift key is used. Elementary school students, especially, often try to use the shift key located on the same side of the keyboard as the letter key being capitalized.

The shift key should be released immediately after the letter key is struck. Pauses or breaks should be avoided before or after the shift-key reach. Continuity of keyboarding (typing without breaks or pauses) is the goal. Also, it is important for students to hold the shift key all the way down as the capital key is struck or tapped.

Introduce the shift-key reach by a teacher-directed activity of demonstration/imitation. Show students proper control of the shift key; have them practice the procedure under your direction. Under your direction, have students practice shift-key drill activities, such as the following: Call *Capital J (space)*, etc., a few times as you observe them. Next, call *Capital Ja (space)*; make certain that students release the left-shift key quickly. Use a similar teacher-directed drill for learning the use of the right-shift key: *Capital F (space); Capital F (space).* Finally, make certain that good shift-key technique is transferred to drill activities from the textbook.

KEY NOTES FOR KEYBOARDING

Section 7: Fundamentals

Skill Conditioner #1: Building Continuity of Keyboarding and Developing Proper Rhythm Patterns. Continuity of keyboarding (typing without breaks or pauses) is an important factor in building keyboarding skill. Likewise, the development of proper rhythm patterns (fluent and variable according to copy word patterns) is crucial.

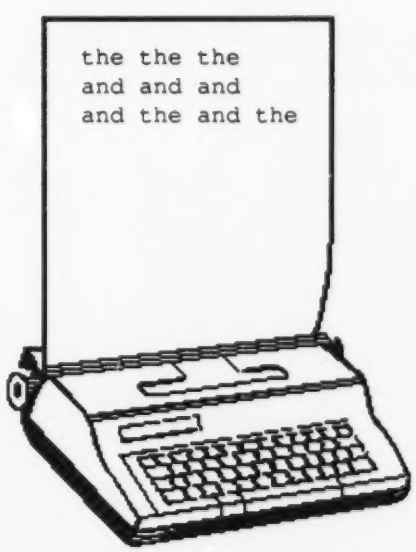
Early in the keyboarding instruction, students should learn to read copy properly for keyboarding so that the keystroking pattern is continuous—without breaks or pauses (see Item 2, Section 7.7). In essence, students learn to anticipate the keystroking by reading slightly ahead in the copy to be typed.

As skill grows or develops, students should learn to keyboard one-hand words (words typed with the fingers of one hand, such as *was, you, are, opinion, poll,* etc.) with a reduced time interval between keystrokes. Also, they should learn to keyboard balanced-hand words (words typed with alternate fingers of both hands, such as *and, the, with, right, land,* etc.) at a word level; that is, the word is typed or keyboarded as fast as the word can be pronounced. And, finally, they develop a smooth, variable rhythm pattern as one-hand, balanced-hand, and/or semibalanced-hand words are keyboarded (and the *date,* the state*ment*, etc.).

To help students develop proper rhythm patterns, teacher-directed drills on balanced-hand words are essential. The teacher can demonstrate the keyboarding of such words at a word level, and have students imitate the keystroking pattern (Example: *the the the; and and and; and the, and the, and the; go with them,* etc.) Another teaching procedure is to have students type each balanced-hand word three times: slowly, faster, top speed. The "top speed" should approximate word-level keyboarding. Also, conduct teacher-directed drills on one-hand words. The student goal on such words should be to reduce the time interval between keystrokes; however, one-hand words can never be typed as fast as word-level words.

Demonstrate variable rhythm keyboarding patterns on such phrases as *and the date* and have students imitate your keystroking pattern. If you find it impossible to do this, call *and the* and then spell *date.* Students typing from your call will begin to approximate a variable rhythm pattern.

Observe students as they keyboard appropriate drills from the textbook. They should work for speed so as to develop the variable rhythm pattern. When this is done, errors should be ignored. The goal is to increase speed and develop the appropriate variable rhythm pattern, which is never metronomic.



KEY NOTES FOR KEYBOARDING

Section 7: Fundamentals

Skill Conditioner #2: Develop Proper Reading of Copy for Keyboarding. Proper reading of copy for keyboarding is a skill to be developed as students learn the letter keyboard. It requires that students learn to read slightly ahead in the copy so as to anticipate the keystroking patterns; first, letters, then words, and finally as the skills grow, word groups.

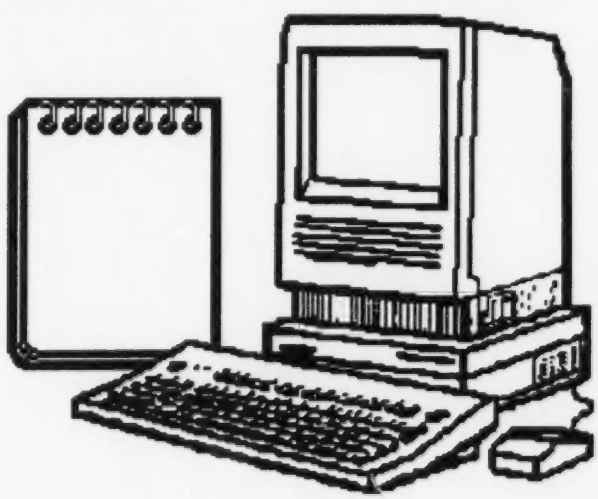
The first essential factor in proper reading of copy for keyboarding is for students to learn to keep their eyes on the copy to be typed. This factor requires the learning of a pattern of concentration on the copy to be keyboarded. Elementary school students, for example, have a great tendency to look at the keyboard as they type, and it takes a great deal of teacher effort to help them learn to keep "eyes on the copy" (textbook or screen copy).

As the letter keyboard is taught, direct students to try to read slightly ahead in the copy to anticipate the keystroking pattern, which in turn will help reduce pauses or breaks in the pattern of continuity of typing. As skill grows, students will then learn to preposition their fingers on the keys so as to reduce the time interval between keystrokes—reading ahead to again anticipate keystroking patterns.

It is helpful to pace students on drill material to help them develop patterns of continuity and the ability to read ahead in the copy to anticipate the keystroking patterns needed. As skill grows to new levels, have students try to read and type in word groups.

Example: ***Try to read / and type / this copy / in these / word groups. /***

Such word reading patterns usually can be developed as students begin to type at 60 or more words a minute. It is yet another way to help students learn to keyboard at their maximum speed potentials. It requires a high level of concentration on the copy to be keyboarded.



KEY NOTES FOR KEYBOARDING

Section 7: Fundamentals

Skill Conditioner #3: Develop the Proper Mind Set. Mind set, or the desire to improve keyboarding skills, is another important factor of keyboarding skill. Most students will have a high degree of motivation for learning to keyboard and will maintain this motivation if the teacher puts emphasis on the things that make a difference in building keyboarding skill.

Here are some of the factors that enter into the development of a proper mind set for keyboarding: (1) students make the effort to improve; (2) they give attention to the development and refinement of the techniques of keyboarding; and (3) they practice all drills according to a defined ***purpose*** (identified by the teacher or given in the textbook) and at an assigned ***level of practice speed*** (slowly, faster, top speed; or, slowly, faster, in-between rate, etc.) as drill lines are repeated during practice activities (again as directed by the teacher or as given in textbook directions).

As a part of developing the proper "mind set" for keyboarding, the teacher should plan for active learner participation in all learning activities. Here it is helpful if the students understand the "learning task'" and if they develop the proper "task set." Example: How to strike or tap keys with speed, and how to eliminate waste motions.

The textbook used should have learning activities arranged in a simple-to-complex learning progression. The teacher's role is to try to make the learning interesting and stimulating. Students should enjoy learning to keyboard or type. At selected intervals, provide for appropriate reinforcement of the learning. Remember, too, to teach, as necessary, for transfer of skill to other learning tasks. In keyboarding, this is relatively easy to do. Finally, as cautioned in the beginning statement to this unit and section, remember to use "process evaluation" rather than "product evaluation" throughout the keyboard learning period.

Teaching keyboarding and learning keyboarding should be a "happy and fun" experience for teachers and students. The discussion of points to emphasize in keyboarding instruction as given in this unit are designed to accomplish this goal.

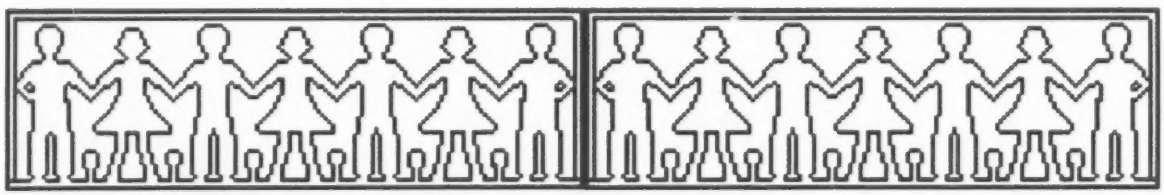
KEY NOTES FOR KEYBOARDING

Section 8: Tips

Introduction. Keyboarding is for everyone. Regardless of a student's physical or mental capability, the ability to key information by touch is an effective and efficient way to use a computer. Because it makes work easier, it enhances learning and generates the desire to improve.

Section 8 offers general tips for reinforcing practice of the shift key, the enter/return key, and the tab key. These tips are applicable for all students. In addition to these reinforcement practice drills, this section contains useful reviews, namely, a review of spacing for punctuation, a review of the placement of quotation marks with punctuation, and a review of information requested by the United States Postal Service for addressing envelopes and using the two-letter state abbreviations.

Additionally, this section offers general considerations for students with special needs that range from physically handicapped to gifted. Consider adapting ideas from ***Teaching Special Needs Students*** to use with any group of students.



42

KEY NOTES FOR KEYBOARDING

Section 8: Tips

General Tips. This section includes easy-to-use strategies for reinforcing the use of the shift keys, the enter/return key, and the tab key. Additionally, it contains a brief review of the correct spacing for punctuation, two-letter state abbreviations, and the postal service guidelines for addressing envelopes.

Reinforcing Use of the Shift Keys. After students have learned to use the shift keys, give them extra skill-developing practice. An easy way to accomplish this is to give two or three daily drills of approximately 30 seconds each in this manner: Using familiar material, direct students to begin each word with an uppercase letter. Remind students that the left shift key is used for uppercase letters on the right side of the keyboard, and the right shift key is used for uppercase letters on the left side of the keyboard.

Reinforcing Use of the Enter/Return Key. It is especially important for students to reinforce use of the enter/return key if the equipment being used has an auto return feature. To reinforce use of the enter/return key, give brief drills similar to the timing described in reinforcing use of the shift keys during which students depress the enter/return key after keying each word.

Students should learn to use the auto return feature if it is available on the equipment being used because greater speeds can be attained. The return key is not used frequently on equipment with the auto return feature; however, it is still important for students to gain speed and skill when using the enter/return key. Remind students that the enter/return key is depressed with the right little finger and that the finger should be returned quickly to its home row position—all this without peeking at the fingers or the keyboard!

Reinforcing Use of the Tab Key. A simple exercise to reinforce use of the tab key is to have students key a list of words, such as their spelling list, and tab after each word is keyed. Default tabs (preset tabs) can be used if they are available on the equipment being used. If the equipment does not have preset tabs, instruct students to set four tabs that are approximately 15 characters apart. That is, the tabs should be set to accommodate the longest word in the list and allow about two or three blank spaces. Remind students that the left little finger depresses the tab key and returns quickly to its home row position—again, without peeking at the fingers or the keyboard!

Spacing for Punctuation and Tips for Quotation Marks. Students will benefit from a review of the spacing that is used with various punctuation marks and the proper way to handle quotation marks with punctuation.

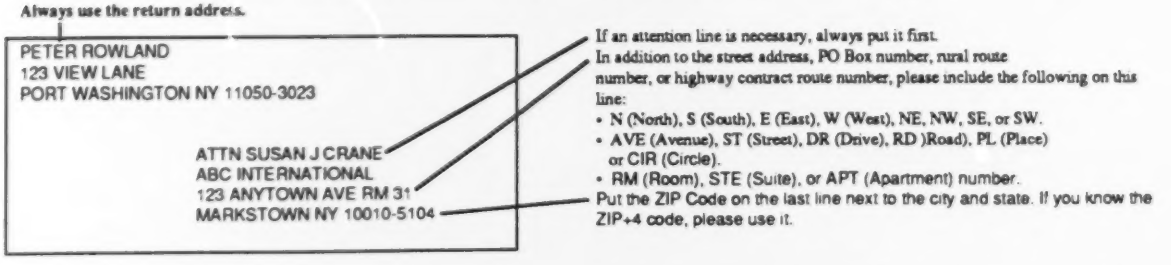
- ***The Period.*** Two spaces after a period at the end of a sentence. One space after a period for an abbreviation within a sentence (Example: Dr. Smith). When an abbreviation period falls at the end on a sentence, only one period is used and followed by two spaces (for the end of the sentence).
- ***The Question Mark.*** Two spaces after a question mark.
- ***The Exclamation Mark.*** Two spaces after an exclamation mark.
- ***The Comma.*** One space always follows a comma.
- ***The Colon.*** Two spaces always follow a colon (same as the period at the end of a sentence).
- ***The Semicolon.*** One space always follows the semicolon (same as the comma).
- ***Quotation Marks and the Period.*** The period always goes inside (before) the ending quotation mark.
- ***Quotation Marks and the Comma.*** The comma always goes inside (before) the ending quotation mark.
- ***Quotation Marks and the Colon.*** The colon always goes outside (after) the ending quotation mark.
- ***Quotation Marks and the Semicolon.*** The semicolon always goes outside (after) the ending quotation mark.
- ***Quotation Marks and the Question Mark or Exclamation Mark.*** Placement of the ending quotation mark depends on the sentence. If the part of the sentence being quoted is the question or exclamation, then the ending quotation mark is placed outside (after) the question or exclamation mark. However, if the quoted part of a sentence is not the question or exclamation, then the ending quotation mark is placed before the question or exclamation mark.

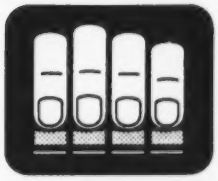
Two-Letter State Abbreviations. The two-letter state abbreviation system is simply a combination of two capital letters with no period. Some state abbreviations are the first two letters of the state name, others are the first and last letters of the state name, and still others do not follow either of these patterns, such as the abbreviations for states with two words. These are the first letter of each word (ND for North Dakota).

The United States Postal Service developed this system to help speed the processing and delivery of mail, and in 1991, it provided guidelines for addressing mail (see illustration). Note that all uppercase letters are used, no punctuation is used, and only one space is between the two-letter state abbreviation and the ZIP code.

STANDARD ABBREVIATIONS

Alabama	AL	Kansas	KS	Illinois	IL	New Hampshire	NH
Alaska	AK	Kentucky	KY	Indiana	IN	New Jersey	NJ
Arizona	AZ	Louisiana	LA	Iowa	IA	New Mexico	NM
Arkansas	AR	Maine	ME	New York	NY	South Dakota	SD
California	CA	Maryland	MD	North Carolina	NC	Tennessee	TN
Colorado	CO	Massachusetts	MA	North Dakota	ND	Texas	TX
Connecticut	CT	Michigan	MI	Ohio	OH	Utah	UT
Delaware	DE	Minnesota	MN	Oklahoma	OK	Vermont	VT
District of Columbia	DC	Mississippi	MS	Oregon	OR	Virginia	VA
Florida	FL	Missouri	MO	Pennsylvania	PA	Washington	WA
Georgia	GA	Montana	MT	Puerto Rico	PR	West Virginia	WV
Hawaii	HI	Nebraska	NE	Rhode Island	RI	Wisconsin	WI
Idaho	ID	Nevada	NV	South Carolina	SC	Wyoming	WY


Always use the return address.
PETER ROWLAND
123 VIEW LANE
PORT WASHINGTON NY 11050-3023
ATTN SUSAN J CRANE
ABC INTERNATIONAL
123 ANYTOWN AVE RM 31
MARKSTOWN NY 10010-5104
If an attention line is necessary, always put it first.
In addition to the street address, PO Box number, rural route number, or highway contract route number, please include the following on this line:
• N (North), S (South), E (East), W (West), NE, NW, SE, or SW.
• AVE (Avenue), ST (Street), DR (Drive), RD)Road), PL (Place) or CIR (Circle).
• RM (Room), STE (Suite), or APT (Apartment) number.
Put the ZIP Code on the last line next to the city and state. If you know the ZIP+4 code, please use it.



KEY NOTES FOR KEYBOARDING

Section 8: Tips

Teaching Special Needs Students. This section offers suggestions for working with learning disabled, moderately mentally retarded, disadvantaged, physically handicapped, partially sighted and blind, hearing impaired, gifted, and English as a second language (ESL) students.

Learning Disabled Students. Using computers with keyboarding instructional software rather than textbooks is effective for students with learning disabilities because eye movement from typing material to the computer screen is eliminated. Additionally, there are fewer stimuli for the student to process that detract attention from the learning process. Instructional periods should be brief and carefully monitored. Pay special attention to technique, seating, and position. Avoid games that have moving letters, words, or objects; these will distract learning disabled children.

Moderately Mentally Retarded Students. Bypassing the need to write by hand extensively eliminates problems created by delayed motor development. Use the computer as a way of involving the hands and providing reinforcement when presenting new subject matter. The ease of entry on the keyboard will create a positive feeling about individual success that can carry over to other activities in school.

Disadvantaged Students. Activities that have proven successful in motivating disadvantaged students are those which reinforce basic information. Students enjoy typing their own names, addresses, and phone numbers. Sequencing dates, days of the week, and months of the year is another reinforcement activity. Keying vocabulary words from basic readers or other printed subject matter helps students learn and reinforce basic information. Alphabetizing lists of words or copying sentences will build skill on the keyboard, as well as build language arts principles.

Physically Handicapped Students. Special equipment is available to help students with some physical handicaps. Joysticks, game paddles, single or dual switches, computer keyguards, moisture guards, and headpointers are some commonly used products. A latching device or caps lock modification for keys is available for those who are unable to use two or three fingers to hold down keys simultaneously. Expanded or mini keyboards, touch-sensitive graphics tables, and special keyboards for one-fingered typists are available. Pay particular attention to the "touch" sensitivity of the keyboard for students with physical handicaps that affect the speed at which they are able to release a key. For these students, select keyboards that are slow to repeat a key stroke if the key is not released quickly.

Keyboard emulators are available for those who cannot use the traditional keyboard. It is likely that the range of keyboard emulators and other devices for the handicapped will be expanded as the computer continues to reach this audience.

Blind or Partially-Sighted Students. Keyboarding skill is useful to blind students because it eliminates frustration experienced in writing braille; it promotes self improvement, self reliance, and a sense of responsibility; and it challenges young learners to enlarge their vocabularies. Specially

designed computers that produce braille-like tape printouts are available for the blind, thus adding the ability for the blind to "read" the information that was keyed

Many existing electronic typewriter and computer keyboards have tactile identification, such as a slightly raised spot, on selected home-row keys. If the equipment being used does not have such identification for home-row keys, textured tape can be added to help students identify hand position on the home row. A software program that provides an audible sound when an incorrect key is struck provides feedback that will affirm correct stroking.

Instruction for blind students should proceed slowly to promote confidence and mastery. Partially-sighted students require some adjustments to the learning site. Magnifying overlays are available for computer screens. Look for large print editions of materials. Book stands should be adjustable so the text is at eye level. Good lighting without glare is of major importance.

Dictate to students in a clear, distinct voice at appropriate speeds. Tape some of the dictation on audio cassettes so that students can repeat the exercises. Daily practice should be limited to 10 to 15 minutes, unless a greater amount of time is approved by a physician.

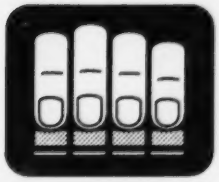
Hearing-Impaired Students. A study carrel helps a hearing-impaired student by controlling the distraction of background noise. Visual distractions, deterrents to the attention span, are also controlled.

English as a Second Language (ESL) Students. In keyboarding classes, ESL students benefit from having other students assigned as their partners to provide assistance with directions. ESL students need teacher-directed instruction—that is, the use of keyboarding software without teacher-directed activities will be of little value to the ESL student.

When new letters are introduced, make a connection with an object that begins with the letter being introduced. For example, relate the letters to colors, fruit, vegetables, clothing, animals, and other familiar objects. When ESL students begin keying words, have their partners pronounce the word, then have the ESL student repeat the word before keying it. As sentences are introduced, repeat the process.

Encourage the participation of the ESL student by asking questions that can be answered by keying a one-word response. Ask students to tell the response that they keyed. As ESL students progress with their knowledge of the English language and their keyboarding skills, assign some work from educational guides that cover subjects such as public transportation, emergency procedures, department stores, supermarkets, post offices, restaurants, holiday celebrations, hobbies, and the like.

Gifted Students. Because of their unique abilities, gifted students should be provided with activities of greater depth and breadth. An activity that can enhance learning for gifted students is to have them create a newspaper. The advantages of word processing, group dynamics, and desktop publishing can be integrated to challenge the abilities of gifted learners. For example, students learn interviewing techniques and use them to gather information for articles. Following the introduction of techniques to review and revise writing, students can serve as editors for each other's work to practice editing skills.



REFERENCES

THIS WE BELIEVE ABOUT KEYBOARDING

A Statement by the Policies Commission for Business and Economic Education (Published in 1984). **NOTE:** *This official statement is reprinted by permission of the Policies Commission for Business and Economic Education.*

The dramatic increase in the use of computers affects our personal and professional lives. The keyboard is and will continue to be the most widely used input device in communicating with computers. Whether an executive uses a keyboard as a means of communication or a student interacts with a computer for drill and practice, the skill of keyboarding shortens input time and increases productivity.

Keyboarding is defined as the act of placing information into various types of equipment through the use of a typewriter-like keyboard. *Typewriting and keyboarding are NOT synonymous.* The focus of a keyboarding course is on input rather than output.

Students

WE BELIEVE THAT KEYBOARDING SHOULD BE REQUIRED OF ALL STUDENTS. With the rapid expansion of computer usage, primarily microcomputers, educational institutions should require that all students develop keyboarding skills. Keyboarding skills will allow students to interface more efficiently with microcomputers in educational, personal, and/or future employment settings. The keyboard, as used on typewriters, word processors, microcomputers, and computer terminals, serves as the primary device for inputting information (words, numbers, and symbols) into electronic information processing systems (word processors, computers, or integrated systems). Students should develop keyboarding skills just prior to the time they will apply the skill. Therefore, it is critical that keyboarding instruction be provided over a wide range of grade levels.

Curriculum

WE BELIEVE THAT KEYBOARDING CURRICULUM SHOULD BE DEVELOPED TO REFLECT APPROPRIATE INSTRUCTIONAL OBJECTIVES AND CONTENT. Instructional material should provide ample practice on alphabetic and numeric characters, symbols, and control and function keys. Copy should be similar to the material which students will input after developing their keyboarding skill.

Instructional Objectives

WE BELIEVE THAT AFTER SUCCESSFULLY COMPLETING 25 TO 45 HOURS OF INSTRUCTION IN KEYBOARDING, STUDENTS SHOULD BE ABLE TO:

- Demonstrate the correct "touch" method for operating alphanumeric keys
- Demonstrate the correct "touch" method for operating a ten-key pad
- Demonstrate a straight-copy speed of 25 to 40 words per minute (2.5 to 4 lines per minute) on 1- and 2-minute timed input exercises. Errors should be unacceptable since electronic corrections are part of the "touch" method on an electronic keyboard. (This objective assumes that keyboarding will be taught on an electronic keyboard and the speed expectations are dependent upon the grade level and the number of hours of instruction.)
- Demonstrate the ability to work from straight-copy and rough-draft material
- Demonstrate the ability to proofread both alphabetic and numeric data

- Demonstrate the ability to follow oral and written directions
- Demonstrate the ability to compose at the keyboard.

Levels of Instruction

Elementary schools should focus on the development of the "touch" method of inputting on an electronic keyboard. This can be accomplished by combining the business educator's competence in keyboarding and knowledge of psychomotor skill development with the elementary teacher's knowledge of the learning patterns of this age student.

Middle/junior high schools should focus on the development of the "touch" method with the addition of formatting skills. An introduction to business applications will provide a realistic reinforcement of the need for a personal and occupational skill of keyboarding. This course can also serve a guidance function as an introduction to the business education program at the secondary level.

Secondary schools should require keyboarding skills for graduation. For students entering high school who have not acquired these skills, a keyboarding course should be provided. The same objectives from the elementary and middle/junior high school courses would apply with greater emphasis given to personal and business applications.

Postsecondary institutions, including colleges and universities, and continuing education programs should utilize the secondary level objectives with instructional material appropriate for postsecondary school students. Instructional material should be relevant to the area of concentration of each student.

Responsibilities

WE BELIEVE THAT BUSINESS EDUCATORS SHOULD PROMOTE AND ASSIST IN THE TEACHING OF KEYBOARDING AT ALL LEVELS OF INSTRUCTION.

WE BELIEVE THAT BUSINESS EDUCATORS SHOULD EQUIP THEIR KEYBOARDING CLASSROOMS WITH MICROCOMPUTERS.

Business Education Teachers

Business education teachers have the responsibility of

- Promoting keyboarding courses in their institutions
- Communicating to students, teachers, counselors, administrators, parents, legislators, and businesspersons the need for this course
- Developing curriculum consistent with the identified objectives
- Providing instruction for this course
- Working cooperatively with elementary teachers to provide keyboarding instruction at the elementary school level.

Business Teacher Educators

Business teacher educators have the responsibility of:

- Providing preservice and in-service instruction for teaching keyboarding
- Assisting in development of curriculum
- Assisting in evaluation of hardware and software appropriate for keyboarding instruction
- Providing keyboarding instruction to all students at their institutions.

Business Education Supervisors

Business education supervisors at state and local levels have the responsibility of focusing upon the broad issues associated with keyboarding by:

- Recommending and approving the acquisition of microcomputers
- Assisting in development of curriculums
- Expanding certification to include keyboarding instruction at the elementary school level
- Promoting keyboarding to administrators
- Providing in-service for teachers.

WE BELIEVE THAT ALL BUSINESS EDUCATORS SHOULD WORK TO ENSURE BUSINESS EDUCATION'S ROLE IN KEYBOARDING.

REFERENCES

A RESEARCH SUMMARY

This **SUMMARY OF KEYBOARDING/WRITING RESEARCH** is the report on research conducted at Seeds University Elementary School (UES) in California by Dr. Lawrence W. Erickson, Professor of Education, Emeritus, UCLA Graduate School of Education, between 1984 and 1986. This summary report is significant to elementary/middle school educators because findings address the recommendations for keyboarding instruction in conjunction with the writing process.

Objectives/Purposes of Research

The objectives and purposes of the research were as follows:

1. To determine the time necessary for elementary school students, ages 10-12, to develop a usable keyboarding skill that could then be applied to writing (composition) improvement. (Typewriters were used during the 1984-85 and the 1985-86 keyboarding instructional programs; typewriters were used for the 1984-85 writing program and computers were used for the 1985-86 writing program).

2. To evaluate the effects of learning materials and teaching approaches in developing keyboarding skill.

3. To evaluate the effects of keyboarding skill on writing (composition) improvement using two different writing approaches for the writing instruction.

Methods/Techniques/Procedures

1984-85 School Year. During the 1984-85 school year, upper elementary students (57 students, ages 10-12) were given keyboarding instruction on IBM Selectric II typewriters for a period of eight weeks on a daily basis. Class periods were approximately 40 minutes in length. These students then used their keyboarding skills in a writing program which tested *writing-as-a-process* as an overall approach to the improvement of writing skills. The time devoted to the writing program was approximately 15 weeks, again on a daily class period of approximately 40 minutes. During the writing period, students were given instruction in six different writing-as-a-process approaches:

- Basic,
- Writing for Meaning,
- Experiential/Journalistic,
- Epistemic,
- Prose,
- Rhetorical.

Each writing approach was evaluated as to its effect on the development of writing skill.

1984-85 Writing Schedule. Class periods devoted to the writing program were as follows:

Orientation to Writing	5 periods

Writing-as-a-Process: Approaches evaluated, plus the following approximate time schedule:

• ***Basic Writing***	10 periods
• ***Writing for Meaning***	10 periods
• ***Experiential/Journalistic***	20 periods*
• ***Epistemic*** (Writing from Knowledge)	10 periods
• ***Prose Model***	10 periods
• ***Rhetorical***	10 periods

*The *Experiential Approach* was combined with the *Journalistic Approach* because the students

wanted to produce a newspaper. The extra time was needed for the organization necessary for producing the newspaper, plus a field trip to the *Los Angeles Times* to see how a newspaper is produced.

1985-86 School Year. During the 1985-86 school year, another group of upper elementary students (30 students, ages 10-12, plus 29 carryover students from the previous year who were not included in the analyses of the data collected) were given keyboarding instruction on IBM Selectric II typewriters, again for a period of eight weeks on a daily 40-minute per class period basis. The 30 students who were made a part of this study were equated with the 1984-85 students as to overall ability as evaluated by the upper elementary school teachers. The students used Hewlett-Packard 150 computers for their writing activities. They were given a one-week program on the use of computers and the word processing package (MemoMaker). After this orientation period, they used their keyboarding skills in a program which tested a *structured approach* to the improvement of writing skills. The time devoted to the writing program was, again, approximately 15 weeks. During the writing program students were given instruction in six different methods of paragraph development, each of which stressed structured writing (good use of grammar, spelling, unity, coherence, use of topic sentences with controlling ideas, etc.):

- Example,
- Definition,
- Comparison and Contrast,
- Classification and Division,
- Cause and Effect.
- Process Analysis.

The writing improvement of these students was compared with the writing improvement of the students in the 1984-85 study.

1985-86 Writing Schedule. Class periods devoted to the writing program were as follows:

Orientation to Hewlett-Packard 150 computers with introduction of word processing package (MemoMaker)	5 periods
Orientation to writing	5 periods

Structured Writing: The following six paragraph development approaches were introduced:

• ***Example***	9 periods
• ***Definition***	9 periods
• ***Comparison and Contrast***	9 periods
• ***Classification and Division***	9 periods
• ***Cause and Effect***	9 periods
• ***Process Analysis***	9 periods

Approximately 11 periods were devoted to "free writing."

Types/Sources of Data Collected—1984-85/ 1985-86 Studies

Pre- and post-writing tests were administered to both groups discussed. Writing gains, if any, were statistically evaluated and analyzed. Also, each writing approach within each of the general approaches to writing was evaluated and statistically analyzed to determine which approach, if any, seemed to have the most effect on writing improvement.

Students' written work within each writing approach was collected and evaluated. Also, the way students responded to each writing approach was observed and evaluated (student self-evaluation of the writing approach, as well as teacher/researcher observations to students reactions to each approach).

Students' written work was scored on a 1-10 basis, with a 10 representing the best score. A trained evaluator was utilized for the evaluation of student work, in addition to the evaluation given the work by this reseacher. Scores given to papers were compared and any discrepancies noted resulted in a re-reading of the papers in question. When the discrepancy could not be resolved in this manner, an average of the two scores was given to the paper in question.

Findings/Results

1984-85 School Year

1. At the end of the keyboarding instructional program (approximately 25 hours of instruction), students keyboarded at rates ranging from 38 to 142 words a minute on one-minute sentence writings, with a median rate of 70 words a minute. The rates are in terms of gross words a minute (no error deduction or penalty). Accuracy of keyboarding, as such, was not stressed except as students were not permitted to type "gibberish." In the final tests, students averaged three errors a minute.

2. The students in the writing-as-a-process group made statistically significant writing gains (beyond the .01 level). Observations indicated that the students were highly motivated by the approaches used. Student self-evaluations of each writing approach supported teacher/researcher observations.

3. Many parents wrote letters to the researcher indicating their enthusiasm for the writing program and the effect it had on their son's/daughter's motivation for school.

4. The keyboard learning materials used with the 1984-85 group produced statistically superior results as compared with the keyboard learning materials used with the 1985-86 group.

5. As might be expected, the experiential/journalistic approach proved superior to the other approaches tested; however, there were some students who produced their best papers in the other approaches.

The mean scores of student writing in each approach are as follows:

Basic	7.25
Writing for Meaning	6.80
Exper./Journalistic	7.63
Epistemic	5.46
Prose	6.90
Rhetorical	6.11

1985-86 School Year

1. At the end of the keyboard instructional program (approximately 25 hours of instruction), students keyboarded at rates ranging from 16 to 70 words a minute on one-minute sentence writings, with a median rate of 31 words a minute. The measurement was made on the same timed writing material used with the 1984-85 group. Again, the rates are in terms of gross words a minute. As was true for the 1984-85 group, accuracy of keyboarding was not stressed except as students were not permitted to type "gibberish." In the final tests, these students averaged four errors a minute.

2. A different set of keyboard instructional materials was used with the 1985-86 group to test its effect on the development of keyboarding skill. The instructional approach remained the same. Differences in skill gains were statistically significant beyond the .01 level in favor of the 1984-85 group.

3. Although students in the structured writing program made writing gains, the writing gains were not at the same level of significance as the 1984-85 writing group. Also, enthusiasm of the students for the writing approach was observed to be at a lower level as witnessed by their frequent requests for "free writing." Also, structured writing seemed to have an inhibiting effect on student creativity in writing.

4. It would appear that the structured writing approach was too sophisticated for this age group and may be more effective with an older age group.

Conclusions and Recommendations

To the extent that the findings of these studies are valid, the following conclusions seem warranted:

1. **Age Level for Effective Keyboard Learning.** The ideal age level for effective keyboard learning, according to these and other keyboarding studies by this researcher at the elementary school level, would seem to be the upper elementary school level (ages 10-12).

Students at this level can develop outstanding keyboarding skills in relatively short periods of time, and they can readily transfer their keyboarding skills to other learnings, such as the improvement of writing (composition) skills. The use of a keyboard for writing has proved to be more effective as a writing tool than is a pen or pencil.

The Keyboarding Rates Table shows keyboarding rates of elementary school students (studies with Seeds UES students) of various age levels. These conclusions may be drawn after a study of the table of rates, and after observations made by this researcher as he taught students of various age groups, with the exception of the 6-7 year olds. (See Keyboarding Rates Table on page 46.)

a. ***Ages 6-7***. Students of this age group were taught keyboarding by one of the regular UES teaching staff during a 6-week summer session. It is obvious that students at this age level do not have the developmental skills needed for effective and efficient learning of keyboarding skills; nor, would the instruction be considered cost effective.

b. ***Ages 8-9.*** This age group of students (middle level) were taught keyboarding by this researcher. Only a limited time could be devoted to the keyboarding instruction, a total time of 14 instructional hours divided into daily 30-minute class periods. This time period was not sufficient.

Although these students achieved at reasonable keyboarding rate levels, it did appear that many students did not yet have the developmental skills needed for effective keyboard learning. They tended to look at the keyboard as they learned keyboarding. Development of such a habit pattern seriously retards or inhibits the development of a true touch system in operating the keyboard.

In addition, these students need a program of keyboard maintenance after learning the keyboard, or they rapidly lose their keyboarding skills. Many of the students in these groups were given additional keyboarding instruction by the regular UES instructional staff. Despite this additional instruction, observation of the students by this researcher indicated that they did not greatly increase their keyboarding rates, and after the keyboarding instruction was completed, a majority of the students (as observed at work on computers) seemed to revert to hunt-and-peck methods of operating the keypad of the computer. All this evidence would seem to indicate that keyboarding instruction at this age level is not cost effective in terms of either teacher or student time. Also, these students did not appear to have the intellectual skills needed for utilizing the keyboard in a writing improvement program.

c. ***Ages 10-12.*** Students at these age levels can develop good keyboarding skills in a relatively short period of time. Group A, for example, learned to keyboard using a touch system at rates ranging from 38 to 142 gross words a minute (sentence writings) after a period of approximately 25 hours divided into 35- to 40-minute daily class periods. Group B, exposed to the same instructional procedure, however, did not achieve at this same high level. A different set of instructional learning materials was used with this group and these materials were not as effective as were the learning materials used with Group A, and the differences in rates achieved were statistically significant beyond the .01 level in favor of the Group A students. This conclusion is confirmed by a study of the rates achieved by groups 2 and 3 (Ages 8-9) as shown in the Keyboarding Rates Table. These students used the same learning materials as did the Group A students.

2. **Learning Materials.** The nature of the learning materials used for keyboarding instruction had a dramatic effect on the overall keyboarding skill developed by students. (See keyboarding rates of Groups 2, 3, and A in the Keyboarding Rates Table on page 46.)

3. **Teaching Approach.** A teacher who understands how skill learning takes place, and who knows what to look for as students learn keyboarding skills, would seem to be important if students are to develop their keyboarding skills to the maximum during a keyboarding instructional program. Emphasis on the ***fundamentals of keyboarding learning*** is of primary importance. Teacher demonstration of skill learning

fundamentals with immediate student imitation leads to rapid skill gains on the part of students. This See/Hear/Imitate (***Sight/Sound***) approach helps students understand the changes they need to make in their keyboarding behavior if they are to improve their keyboarding skills.

4. **Improvement of Writing (Composition) Skills.** As indicated, after approximately 25 hours of keyboarding instruction, upper elementary students (ages 10-12) can develop a usable keyboarding skill which can then be used as an aid to other learnings, such as the improvement of writing skills.

a. ***Writing-as-a-Process vs. Structured Writing.*** The writing-as-a-process approach to writing improvement proved to be a much better approach to writing improvement than did a structured writing approach. The latter approach seemed to inhibit student creativity in writing, motivation, and other learnings.

b. Additionally, ***students in the writing-as-a-process program improved their general writing skills (grammar, spelling, unity and coherence of paragraph materials, etc.) more than did the students in the structured writing program,*** even though the students in the structured writing program were given specific and continuing instruction in the mechanics of English usage, etc., and the students in the writing-as-a-process program were not given such instruction. In the latter program, only "common and frequently made errors" were discussed with the students.

The structured writing program seemed to have an inhibitory effect on student creativity in writing. As indicated earlier, it may be that this approach is too sophisticated for students at the elementary school level, although it would be the opinion of this researcher that the writing-as-a-process approach is a much better approach to writing improvement at whatever grade or age level, from the elementary school level to the collegiate level.

5. **Use of Computers for Writing.** The use of computers for writing with an easy-to-learn word processing software package seems to have a highly motivational effect on student writing, primarily because of the ease of error correction and the making of editorial changes in copy after it is completed. When typewriters are used, students usually have to completely retype copy if extensive corrections are made in the copy.

OVERALL RECOMMENDATIONS

With the introduction of computers into the elementary school program, serious attention needs to be given to the need for keyboarding instruction; however, as indicated in this report, such instruction seems to be most effective and efficient when given at the upper elementary school level (ages 10-12). Once keyboarding instruction is given, the skill should be applied on a regular basis or it will rapidly deteriorate. Additionally, a planned program of keyboarding skill maintenance must be included in any learning program which involves the use of keyboarding in learning of other skills. Here, again, a knowledgeable teacher is needed who understands that keyboarding skill maintenance is important. Such understanding can be developed with elementary school teachers in short workshop instructional programs directed by a competent person who thoroughly understands keyboarding skill learning.

See *Keyboarding Rates Table* on Page 46

KEYBOARDING RATES TABLE

1' Writings (Sentence Material)

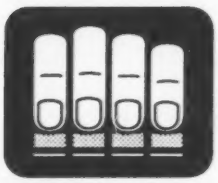
	No. of Students		GWAM	Median
Ages 6-7 (Six weeks of instruction; 30' daily. Total: 15 hours)	Group S	16	1 to 21	9
Ages 8-9	Group 1	26	10 to 38	22
	Group 2	23	10 to 56	30
	Group 3	24	10 to 53	30
	Group 4	25	10 to 49	22
(Five weeks plus three days of instruction; 30' daily. Total: 14 hours)				
Ages 10-12	Group A	57	38 to 142	70
	Group B	30	16 to 70	31
(Eight weeks of instruction; 35' to 40' daily. Total: Approx. 25 hours)				

Groups S, 1, 4, and B: Used "Learning Materials CK"
Groups 2, 3, and A: Used "Learning Materials TOL"

Note: Students were assigned to Groups 1, 2, 3, and 4 so as to equate groups in terms of learning ability, ethnicity, and age. Administration of the Otis-Lennon School Ability Test (Elementary Form R) indicated no statistically significant differences between the groups as to learning ability. A similar plan was followed to equate Groups A and B as to learning ability.

With the exception of Group S, which was taught by the regular summer school teacher who had no background nor experience in teaching keyboarding, all other groups were taught by the researcher.

(c) Erickson Research Projects



REFERENCES
MISCELLANEOUS

The development of a practical, easy-to-use document—and not a formal, footnoted work—was the committee's assignment. During the development of this document, several reference resources were reviewed and noted by committee members. Rather than omit the noted information entirely from this document, selected portions that address the benefits for implementing keyboarding instruction (see Unit 1 Section 1) are included in this section. A narrative style is used, with names in bolded type. A related reference list, alphabetized by author/resource, is provided at the end of this section.

Uses students' time wisely

With varying emphases, authors agree that keyboarding skill allows students to use their time more wisely than they would if they were forced to search (as untrained students would) for each letter. Instead of "hunting and pecking" while striking keys, **Keith Wetzel** points out that trained keyboarding students have time to spend in problem-solving activities more basic to the composition process. In 1988 **Patricia D. Whitman** and **Richard Martin** reported that sixth-grade students who had received 16 hours of keyboarding instruction decreased their average time on a computer lesson from 60 minutes to 40 minutes or less.

Offers effective use of school equipment

How can keyboarding skills impact the use of school equipment? In 1984 **Evelyn Kisner** pointed out, "Computer time is too costly to be wasted while some students hunt and peck." The 1988 **Whitman/Martin** study reported on a 1985 research project conducted at Glenoaks School in Glendale, California. Using 36 battery-powered electronic typewriters (purchased in 1982 for less than $100 each), the school provided instruction to 137 fifth and sixth graders for 25 minutes a day for eight weeks, for a total of 16 hours. Machines were stored in and transported on a specially built cart. After 16 hours of instruction, student test scores ranged from 15.6 to 37 words per minute with 0-2 errors on one- and two-minute timed writings. Both students and staff were excited about the project. At the end of the study, each typewriter had been used 100 hours. The cost per student station was approximately $104. With five students using each machine, the cost per year per student was $21. If equipment lasted five years, the cost would amortize to about $4 per student. When the costs of paper and a thermal tape cartridge were added, the total was about $6 per student. Using the equipment longer than eight weeks with more than five students per station would further decrease the per capita.

Typewriters vs. Computers. The summary of a practical research project to assess the comparable effectiveness of providing introductory keyboarding instruction on typewriters, on computers, and on a combination of typewriters and computers was conducted during 1987 and 1988 by **Betty L. Boyce**. The study compared student outcomes after completing a one semester course of introductory keyboarding at the high school level. The conclusions of this study indicated that there were no major differences in keyboarding achievements relative to the equipment being used.

Supports improved language arts skills

Numerous studies have shown that keyboarding has had positive effects on the development of spelling, language arts, and writing skills. New York is one of several states that currently requires keyboarding in elementary

schools. A 1986 study from the **New York State Education Department** stated that keyboarding is considered important because of the following benefits of using computers in English language arts:

> Computers allow English teachers to emphasize writing as a process " . . . the process of composing, the process of comprehending, the process of responding to literature, the process of critical thinking." Using the computer, one can manipulate words and sentences easily. The computer is thus a "natural vehicle for facilitating and strengthening the processes of the mind."
>
> Computers allow students the freedom to "play" with the English language. The nature of language learning is " . . . active, engaged, and personal." Software programs often encourage peer interaction and promote language learning. The computer allows students, in a nonjudgmental way, to explore and manipulate the patterns and functions of language.
>
> Computers, by their very nature, help students overcome some of the formless and cumbersome problems of writing. Computers, with their ability " . . . to store large quantities of text; to allow the user to insert, delete, and rearrange material; and to match the text against spelling checks or style analyzers [enable] students to discover what they have to say, bring shape to their writing, and perform the final polishing with a minimum of fuss."
>
> Computers help students and teachers by making it easier to manage instruction in the "multi-faceted" discipline of English. With computers, teachers can better address the divergent needs of large numbers of students with varying abilities. Computers, used properly, " . . . can save time, provide periodic reports of progress, make possible greater individualization, and help teachers manage students and instruction more effectively. "

In 1986 **John Cameron** reported on his students' experience on computers. He explained the benefits of keyboarding to the writing process as follows. When students can type at a rate that approximates or exceeds their handwriting speed, they are more willing to edit and proofread their writing. With access to word processing, his students were more willing to type revisions, since their speed was sufficient to free them from the need to "hunt" for each key. His students' writing skills improved "invariably." Keyboarders, he found, ". . . are far more interested in the quality of their work, and having mastered the key locations, they pick up concepts and develop skills in other applications more easily than nonkeyboarders."

Training on how to use a keyboard has had favorable impact on student spelling and reading levels. **Cameron** puts numerous studies on the relationship between spelling and keyboarding in perspective when he summarized: "Virtually every study indicates an increase in spelling ability, a sequence that begins with Kasson in 1895." In 1984 **Rebecca Boles** and **Claudia Jensen** found that keyboarding training brought improved reading levels. Outstanding examples cited included a fourth-grade boy in 1985 who moved ahead two reading groups and a girl in 1985 who increased her reading rate by one basic reader within one month after she started keyboard training. Students in a 1985 fifth grade and a 1985 sixth grade also made impressive reading gains after they started keyboard training. **Boles** and **Jensen** predicted that the more they taught keyboarding to primary grades, the more impact it would have on reading and writing scores.

Supports improved handwriting

Although some fear that keyboarding training might detract from students' handwriting skills, the reverse appears to be true. **Lawrence Erickson**'s 1959 findings, republished in 1987 in a document developed by **Betty L. Boyce** and **Patricia D.Whitman**, showed that typewriting instruction with an experimental group of fifth grade students " . . . had a highly favorable effect, as measured by the Ayres Handwriting Scale, upon both quality and the speed of handwriting." The experimental group, though using typewriters for most of their written work during a five-month period, nonetheless made

greater improvement than the control group in the quality and speed of their handwriting.

Wilma Oksendahl described experiments in Hawaii's Typewriting, English Program. Results confirmed that as elementary students typed, they improved finger dexterity, eye-hand coordination, and muscle coordination, all of which are important prerequisites for the development of handwriting skill. **Oksendahl** further pointed out that students who learn typewriting have a skill that ". . . is faster and more legible than handwriting . . . ." With typewriting, children can communicate their thoughts "quickly and painlessly."

Expands students' interest and likelihood of success in other subject areas

Computer programs are available for nearly any subject in the curriculum. **Jerry Robintson** found that in the early 1980s, 62.4 percent of all elementary schools in the country were already using personal computers or microcomputers for elements of instruction in a variety of subject areas.

A 1986 study by **Gamma Omicron Chapter, Delta Pi Epsilon**, found that keyboards were being used in Oregon schools in reading/language arts, spelling, science, math, social studies, health, special education, and programming activities.

The advantages **Oksendahl** noted in using typewriter keyboards seem equally applicable to computer keyboards. **Oksendahl** wrote that knowing how to use a typewriter helped students become independent learners. She reasoned that such skill allowed students to develop self-reliance, form systematic work habits such as how to follow directions and how to make routine machine adjustments without teacher assistance; and accept personal responsibility for setting goals, completing projects, and evaluating work.

In 1989 **Gregg Condon, Jack Hoggatt**, and **Anita Weston** wrote that, for younger elementary students, the computer is a tool of instruction, a medium of self-expression, and a tool of literacy. In their 1989 study, they stated: "The United States is rapidly approaching the time—indeed, may have already reached it—when the use of a keyboard is equally as important as the use of a pen. An increasing awareness that proficiency with a keyboard is a skill that can no more be left to chance than proficiency with a pen exists."

Lays the foundation for a vital lifelong skill

Keyboarding is one of the most critical skills all students will need for the future. In 1988 **R. A. Nagle** predicted that by 1995 computer technology would proliferate to such an extent that 95 percent of what we want to know will be stored in computers. **Rose Mary Wentling**'s study of business graduates from 1981 through 1987 reported the following finding: "The majority of business professionals in all fields utilize the computer during a typical work day." Over one third of the business professionals surveyed, however, did not have keyboarding skills. The major barrier to acquiring them was that ". . . keyboarding had not been required in their program of study and they were not given the opportunity to learn keyboarding skills." Moreover, most companies in which the graduates were working did not have company training programs available nor did they require keyboarding skills. Yet the majority of the graduates surveyed recognized that keyboarding skills would substantially increase their productivity and suggested they be taught at the high school level. **Wentling**, however, specifically recommended that elementary, as well as secondary, school leaders ". . . explore the feasibility of requiring all students to take instruction in keyboarding" before students have had "significant encounters" with computer use.

Elementary and middle school students should not wait to learn keyboarding skills. In 1988, **Carolee Sormunen** found that students were using keyboards at home and at school regardless of whether they have learned proper techniques.

The concern is that, if students are using keyboards without learning proper techniques, teachers may not be able to help them break bad habits later. In 1985 **Lynda Frankeberger**

reported the frustration of seeing students who have been allowed to "hunt and peck." Such students developed improper habits which are often difficult to correct and which become a barrier to keyboarding productivity. The 1989 study by **Condon** and others reported that " . . . three quarters [of the elementary school administrators surveyed] agreed that students who learn to keyboard without proper instruction must overcome improper techniques."

Other resources

As an elementary or middle school educator, you may have decided to support keyboading programs for your students but wonder where to begin reading as you survey long bibliographies of keyboarding studies. In addition to the teachers' manuals accompanying keyboarding texts, the publications of two organizations may prove especially helpful. Recent studies sponsored by the National Business Education Association (NBEA) and Delta Pi Epsilon (DPE), organizations whose membership consists primarily of business educators, have addressed the concerns of elementary and middle school educators interested in keyboarding.

This document is one of several being prepared by NBEA to assist you in planning your keyboarding program and integrating it effectively into an articulation plan for your school. NBEA also sponsors a quartely journal, *Business Education Forum*, and annual yearbooks. While *Forum* articles are too numerous to mention, articles in two recent NBEA Yearbooks may be of interest to you. The 1987 Yearbook contains two articles that may concern your programs, one by **Julian Milkes** and the other by **Ella Fisher**. **Milkes** offers advice on "Integrating Business Technology into the Elementary School Curriculum." **Fisher** offers advice on "Integrating Technological Changes into the Middle/Secondary Curriculum." The 1989 yearbook contains another article by **Fisher** that addresses computer literacy for younger students.

For information on existing attitudes toward keyboarding, refer to the 1989 Delta Pi Epsilon national research study by **Carolee Sormunen, Mary Ellen Adams, Diane Berg,** and **Lila Prigge,** A National Study of Instructional Practices and Perceptions of Elementary Teachers About Typewriting and Keyboarding.

REFERENCES

Boles, Rebecca, and Claudia Jensen, "Effects of Keyboarding on Reading and Writing Levels." Unpublished research project, Eastern Oregon State College, LaGrande, Oregon, 1985.

Boyce, Betty L., "Determine the Comparable Effectiveness of Providing Introductory Keyboarding Instruction on the Typewriter, on the Microcomputer, and on a Combination of the Typewriter and the Microcomputer." Research study conducted through the cooperative efforts of Yolo County Superintendent of Schools Office, Woodland Joint Unified School District, and the Business Education Unit, California Department of Education, 1988.

Cameron, John, "Keyboarding in the Elementary School," Computers in Education, March, 1986.

Condon, Gregg, Jack Hoggatt, and Anita Weston, "Public School Administrators' Perceptions Concerning Elementary School Keyboarding," The Delta Pi Epsilon Journal, Summer 1989.

Erickson, Lawrence W., "The Manual Portable Typewriter as a Tool of Learning with Fifth-Grade Elementary School Pupils," original report with supporting data on file at Teachers College, Columbia University, 1959. Reprinted as pp. 21-29 of Appendix A in Betty L. Boyce and Patricia D. Whitman's, Keyboarding Facilitator Handbook, Business Education Center, California State Polytechnic University, Pomona, California, 1987.

Fisher, Ella H., "Integrating Technological Changes into the Middle School/Secondary Curriculum," Business Education for a Changing World, NBEA Yearbook No. 25, Reston, Virginia, 1987.

Fisher, Ella H., "Presecondary Computer Literacy," Asserting and Reasserting the Role of Business Education, NBEA Yearbook No. 27, Reston, Virginia, 1989.

Frankeberger, Lynda, "Keyboarding: Success in Elementary Grades," The Balance Sheet, January-February, 1985.

Gamma Omicron Chapter, Delta Pi Epsilon, "Needs Assessment: Computer/Keyboard Training on the Elementary School Level," An Action Research/Service Project, Oregon State University, Corvallis, Oregon, October, 1987, Business Education for a Changing World, NBEA Yearbook No. 25, Reston, Virginia, 1987.

Milkes, Julian, "Integrating Business Technology into the Elementary School Curriculum," NBEA Yearbook No. 25, Reston, Virginia, 1987.

Nagle, R. A., "The Ideal Job Candidate of the 21st Century," Trainer's Workshop, May-June, 1988.

New York State Education Department, "Developing Keyboarding Skills to Support the Elementary Language Arts Program," Bureau of Curriculum Development, Albany, June 1986.

Oksendahl, Wilma. "Keyboard Literacy for Hawaii's Primary Children," Educational Horizons, Fall 1972.

Robinson, Jerry, "Elementary Keyboarding: Some Factors to Consider," Century 21 Reporter, Spring, 1985.

Sormunen, Carolee, Mary Ellen Adams, Diane Berg, and Lila Prigge, A National Study of Instructional Practices and Perceptions of Elementary Teachers About Typewriting/Keyboarding, Delta Pi Epsilon, Little Rock, 1989.

Sormunen, Carolee, "Summary Report: Use of Microcomputers and Perceptions of Keyboarding Instruction in Indiana Elementary Schools," A Presentation given at the National Business Education Association National Convention, Denver, March 30, 1988.

Wentling, Rose Mary "Computer Keyboarding Skills Needed by Business Professionals," The Delta Pi Epsilon Journal, Winter, 1990.

Wetzel, Keith. "Keyboarding Skills": Elementary, My Dear Teacher?" The Computing Teacher, June 1985.

Whitman, Patricia D. and Richard Martin, "Cost Effective Keyboarding at the Elementary Level," The Balance Sheet, January/February 1988.